

# **THE GREENING OF REGISTERED APPRENTICESHIP:**

*An Environmental Scan of the Impact of Green Jobs on Registered  
Apprenticeship and Implications for Workforce Development*



U.S. Department of Labor

EMPLOYMENT AND TRAINING ADMINISTRATION

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EMPLOYMENT AND TRAINING ADMINISTRATION

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# I.

## INTRODUCTION

The way Americans view their economic future is being shaped by a combination of challenges that include economic turbulence, a shrinking middle class, declines in some of our nation's once most powerful industries, and the need for new and cleaner energy sources. As a result, interest in the "green economy" and "green jobs" has risen dramatically and is considered a critical strategy to address many of today's most important challenges including stimulating the economy, getting people back to work, providing pathways out of poverty for disadvantaged populations and ultimately expanding the middle class, and providing energy independence while preserving and protecting the environment.



The American Recovery and Reinvestment Act (ARRA) is making significant investments across numerous Federal agencies in these emerging green jobs through a variety of different mechanisms including investments in weatherization, smart grid technology, wind and solar energy, and has provided significant education and training resources to prepare individuals for these emerging careers. In addition, the President has challenged all Americans that their economic future and security will require the pursuit of at least one year of post-secondary education beyond high school which could include community colleges or an apprenticeship.

While numerous reports and studies have been devoted to the topic of defining green jobs (see Appendix B for extracts from some of these reports), construction, transportation, manufacturing, and utilities are all critical industries that will likely make up a significant portion of the emerging green economy. These industries already employ a wide range of occupations including carpenters, laborers, mechanics, utility transmission line operators, electricians, plumbers, equipment operators, environmental remodeling specialists (including mold, lead and asbestos abatement), HVAC mechanics and installers, and sheet metal workers that will help power the green economy. Skilled workers in these and other occupations are already contributing to the greening of America by building solar and wind farms, weatherizing homes and commercial spaces, and working in precision manufacturing or sustainable energy development. These industries and occupations have a rich history in the American economy; and the role they will play in our sustainable environmental future will be even more critical.

National organizations and leaders from these critical industries are already looking at existing and enhanced models for training and educating a diverse workforce and providing sustainable green careers that



can provide a pathway to the middle class. But the talent development strategies required for the green economy are often complex and our nation's ability to address these needs could be hindered if systematic and scalable training solutions are not implemented.

The good news is that one proven training solution has existed in these industries for over 70 years, primarily in the form of Registered Apprenticeship programs and other labor management training programs. Labor management organizations, employer associations, and private businesses have utilized Registered Apprenticeship as the primary (and sometimes only) training mechanism for their industries. This unique earn-while-you-learn model provides immediate benefits to workers in the form of wages and benefits while ensuring employers that training, standards and safety are taught in a consistent and cost-effective manner. Unique qualities of Registered Apprenticeship – its contextual learning, its demand-driven nature, its strong industry partnerships, and its long history of providing a skilled workforce for its industries – position this training solution as a critical talent development strategy for green jobs.

Registered Apprenticeship programs are and will be at the core of the green economy and as the following report – *The Greening of Registered Apprenticeship* – highlights, apprenticeship sponsors are already actively engaged in building a workforce that will power this green economy.



## II.

## EXECUTIVE SUMMARY

This report, *The Greening of Registered Apprenticeship*, is an environmental scan of the impact of recent policies and investments supporting “green jobs” on current and potential Registered Apprenticeship and other labor management training programs. The scan highlights the trends, activities, and changes that are underway in several key industries that will likely make up a significant portion of the emerging green economy. For purposes of this report, the shorthand term “green” is used to represent the various new processes, technologies and materials that will drive a more environmentally friendly and energy-efficient approach to conducting business. This report does not intend to define specific green jobs, but generally sees green jobs as both existing and emerging occupations across a wide range of industries engaged in working with these new green processes, materials, or technologies.

Construction, transportation, advanced manufacturing, utilities, and building maintenance are critical industries at the forefront of our nation’s push to be more energy efficient, less dependent on oil and more environmentally and ecologically sound. Each of these industries depends on its Registered Apprenticeship and rigorous training programs to prepare and educate existing and emerging workers in a variety of occupations.

At the core of the National Apprenticeship System is a vast and dedicated leadership group of almost 30,000 sponsors—both labor and businesses—with deep roots in Registered Apprenticeship and a keen understanding of how to train highly skilled workers to meet market demand. As such, this environmental scan set out to get a baseline understanding of how key Registered Apprenticeship program sponsors and other industries and organizations engaged in training their workforces are preparing to meet the demands of the green economy.

To better understand the impact of green and implications for policy development, the U.S. Department of Labor (DOL), Employment and Training Administration’s (ETA) Office of Apprenticeship (OA) met, during March and April of 2009, with 14 stakeholders representing these critical industries. These interviews centered on three key areas:

1. Assessing the impact of green on their industries;
2. Training and education requirements for the green economy; and
3. Partnerships and collaborations designed to meet the rapidly changing market for green.

The information gathered throughout this process has resulted in some important considerations for Federal, state and local workforce development leaders and partners. Not only are Registered Apprenticeship programs preparing to develop the future workforce for the green economy, but much of the current training and curriculum around green processes, technologies, and materials in these industries is already being utilized by these stakeholders.

In essence, green is not a new approach for the interviewed stakeholders. Each of them expressed vast knowledge of how market demands for more green practices will affect their industries and specific occupations as well as how their organization will meet the potential increased demand. Consequently,

stakeholders re-emphasized that Registered Apprenticeship is positioned to help lead the training of our nation's green-collar workforce. In fact, as materials and market demands change, Registered Apprenticeship stakeholders and the organizations they support are consistently first-to-market in training both existing and new workers.

### **Assessing the Impact of Green**

In many ways, the green economy has already begun to change how the represented industries conduct business, recruit and train workers, and forge partnerships. But the stakeholders interviewed expressed that many of these changes are part of the evolutionary nature of the very industries themselves. In terms of occupational changes and growth, stakeholders are not anticipating a dramatic shift in occupational structures; rather their focus is on enhancing the skills employed in existing occupations to accommodate the new emphasis on green products and processes. In terms of recruitment, a few stakeholders saw significant occupational growth, particularly in the advanced manufacturing and utilities sectors, but they also acknowledged that most of their current efforts center on getting their existing workforce back to 100 percent productivity. Additionally, the shift to the green economy has allowed the industries to connect with an emerging group of potential workers who are looking for careers in socially conscious industries. Lastly, throughout the assessment of the impact of green, stakeholders emphasized that they are working closely with product manufacturers, vendors, colleges, and research institutions to ensure they are using the latest technology and training workers on the most up-to-date products and materials.

### **Training and Education Requirements**

Registered Apprenticeship is the primary gateway for the majority of occupations referenced throughout this report. The apprenticeship programs of the interviewed stakeholders continually address changes in processes, materials, or technologies as the market demands. Now, more than ever, stakeholders are relying on new methods of delivering training curriculum such as electronic media, distance-based learning, and other ways that address current adult learning styles. Curriculum and programs that address green components of existing occupations are already being used to train apprentices and journeyworkers. Additionally, many organizations are looking to more formalized (and sometimes multi-disciplinary) pre-apprenticeship programs that will provide ample pathways out of poverty for traditionally hard-to-serve populations such as minorities, women and at-risk youth. Multi-disciplinary pre-apprenticeship approaches allow stakeholders to address overarching skills within various sectors of an industry, such as math, blueprint reading and safety, to better prepare applicants for openings within apprenticeship programs. Stakeholders recognize the value in ensuring that pre-apprenticeship leads to long-term career opportunities for applicants.

### **Partnerships and Collaborations**

With the rapid emergence of the green economy, stakeholders recognize the power and necessity of partnering with various types of organizations including Federal, state, and local governments; academia; education and workforce partners; and community-based and advocacy organizations. Partnerships and collaborations are taking root to address shared policy goals, training, product development, pre-apprenticeship, industry standards and other elements that are essential to building a skilled green-collar workforce. At the national level, these partnerships may focus on social impacts and green policies, while local training workforce and economic development partnerships address pre-apprenticeship skills shortages or broad-based green initiatives in a specific community or region. Advocacy groups and community-based organizations are actively



involved in our nation's shift to green and many stakeholders have engaged in partnerships with these groups to ensure that pathways out of poverty are established and that America's middle class can be restored.

Some organizations interviewed are also looking to returning veterans and workers transitioning from industries in decline when scaling their workforces. These re-employment efforts are mostly new partnerships and will continue to evolve as the needs of the industries shift to accommodate market demand.

## Conclusion

Throughout this report, information provided by or gleaned from stakeholders is aggregated into high level observations that relate to each of the critical questions posed by this scan. These observations are further summarized into several essential findings based on a summary review of all the information provided by the stakeholders interviewed for this scan. These findings address the impact of the emerging green economy on these industries, Registered Apprenticeship, and implications for workforce development, and can be summarized as follows:

1. Green has already and continues to have a significant, positive and adaptive impact on these select industries and their related occupations.
2. Policies and investments in green jobs should lead to long-term, sustainable careers with an emphasis on building America's middle class.
3. Due to its unique training approach and usage as the primary entry point into key occupations, Registered Apprenticeship is positioned to be at the nexus of the green economy.
4. In order to continue to meet rapidly changing market demands and to appeal to the next generation of skilled workers, Registered Apprenticeship stakeholders are taking advantage of newer, more flexible training approaches for both green jobs and current occupations.
5. Pre-apprenticeship programs and identifying occupational career ladders can provide pathways out of poverty and further engage traditionally hard to reach populations in the green-collar economy.
6. New and innovative partnership models have occurred in order to embrace the changing needs of our global and green economy.
7. Great opportunities exist for widespread, systemic partnerships between Registered Apprenticeship and the education and public workforce system.

These conclusions and the supporting evidence can be accessed by reading the full report, *The Greening of Registered Apprenticeship*, and the accompanying appendices, resources and reference materials.



# III. GOALS AND OBJECTIVES

## Background

At the core of the National Apprenticeship System is a vast and dedicated leadership group of 29,000 sponsors—both labor and businesses—with deep roots in Registered Apprenticeship and a keen understanding of how to train workers to meet market demand. As such, this environmental scan set out to get a baseline understanding of how key Registered Apprenticeship program sponsors and other industries/organizations engaged in workforce training are preparing to meet the demands of the green economy.

Fourteen stakeholder interviews were conducted in person and via telephone during March and April 2009. The goals of the scan included:

- Identify the existing and possible role of apprenticeship in training workers for green-collar jobs.
- Highlight how stakeholders have modified training to accommodate greening of their industries.
- Recognize the size and scope of partnerships that apprenticeship program sponsors utilize to meet training demands in green industries.
- Identify linkages and connections between Registered Apprenticeship, the workforce system and the green economy.
- Discover existing best practices and activities surrounding pre-apprenticeship and activities to train dislocated workers for green jobs.

Through the process of interviewing the stakeholders, OA received additional information from stakeholders that was used throughout this report. This information includes:

- Stakeholder views relating to green occupations, career ladders, skill standards, re-employment, pre-apprenticeship and apprenticeship-related activities;
- Examples of partnerships and how they are being leveraged in relation to green; and
- Challenges and opportunities as they relate to specific topics covered within this report.

## Audience

The National Apprenticeship System's stakeholders represent many of the industries and occupations that are essential to the emerging green economy. To that end, OA set out to gather information that would be useful to a variety of audiences, including but not limited to:

- Federal, state and local workforce leaders and partners;
- Registered Apprenticeship community; and
- Industry groups, nonprofit organizations, community-based organizations, etc.

## Stakeholder Interviewees

The stakeholders interviewed for the environmental scan represent a broad range of industries including building and construction, transportation, advanced manufacturing, building services, and electrical utilities. A list of the general questions asked during the environmental scan and the stakeholder contact information can be found in Appendices C and E, respectively.

## INTERVIEWED STAKEHOLDERS

ORGANIZATION	INDUSTRY	INTERVIEWEE(S)
Associated Builders and Contractors (ABC)	Building and Construction	Robert Piper, Vice President of Workforce Development; Jeff Lambert, Director of Workforce Initiatives, Workforce Development Division; Robert Hirsch, Director of Legal and Regulatory Affairs; and Jennifer Huber, Director of Initiatives and Diversity
Home Builders Institute (HBI)/ National Association of Home Builders (NAHB)	Building and Construction	Frederick Humphreys, President & CEO (HBI); Dennis Torbett, Vice President for Workforce Training and Employment (HBI); Stephen Kramer, Vice President, Residential Construction Academy (HBI)
Independent Electrical Contractors (IEC)	Building and Construction	Robert Baird, Vice President for Training & Development
International Union of Operating Engineers (IUOE)	Building and Construction	Stephen Brown, Director, Construction Training Department
Laborers' International Union of North America (LIUNA) Associated General Contractors (AGC)	Building and Construction	John LeConche, Laborers-AGC Executive Director
National Electrical Contractors Association (NECA)/ International Brotherhood of Electrical Workers (IBEW)/ National Joint Apprenticeship and Training Committee (NJATC)	Building and Construction	Michael Callanan, Executive Director of the National Joint Apprenticeship and Training Committee (NJATC) for the Electrical Industry
National Institute for Metalworking Skills (NIMS)	Advanced Manufacturing	Stephen Mandes, Executive Director
Seafarers International Union (Seafarers)	Transportation	John Mason, Director, Paul Hall Institute
Service Employees International Union (SEIU)	Building Services	Laura Caruso, Director of Policy and Legislation
Sheet Metal Workers International Association (SMWIA)	Building and Construction	James Shoulders, Executive Administrator, International Training Institute for the Sheet Metal and Air Conditioning Industry

**INTERVIEWED STAKEHOLDERS, cont'd**

ORGANIZATION	INDUSTRY	INTERVIEWEE(S)
United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry (UA)	Building and Construction	Michael Arndt, Director of Training
United Brotherhood of Carpenters (UBC)	Building and Construction	William Irwin, Executive Director, Carpenters International Training Fund
United Parcel Service (UPS)	Transportation	Stephen Jones, Corporate Training and Development Manager
Utility Workers Union of America, AFL-CIO (UWUA)	Electric Utilities	D. Michael Langford, President; Jami Simon, Special Assistant to the President

**Limitations of the Scan**

This report is not intended to represent the full range of views of an entire industry and that many industries, employers, and labor organizations are preparing for green using approaches other than Registered Apprenticeship. The list of interviewed stakeholders, as reflected by the current make up of the National Apprenticeship System, is concentrated in the building and construction industry. In addition, given limited resources and time, the scan included only one representative from other industries such as manufacturing, transportation, and utilities. As leaders in their fields, these Registered Apprenticeship stakeholders collectively employ millions of Americans; together they are preparing thousands of apprentices every year for entry into these industries. The insights provided by these industry leaders should be seen as critical information to inform the discussions around the potential and future of green jobs.



## IV.

# ASSESSING THE IMPACT OF GREEN IN SELECT INDUSTRIES

### Background

As leaders in their respective industries, the interviewed stakeholders identified the trends, challenges, and opportunities presented by the growing market demand for green building, transportation, manufacturing, and renewable energy across the United States.

In this section, stakeholder interviews explored these critical issues:

- How are new green technologies, processes and materials impacting the selected industries?
- How is green changing occupations and occupational structures in these select industries?
- What are the key green opportunities for occupational growth in each of the selected industries?

## A.

### Stakeholder Assessment

How are green technologies, processes and materials impacting selected industries?

#### 1. Observation: Green continues to have a significant and adaptive impact on these key industries.

All 14 stakeholders – regardless of the industry represented – agreed that green is impacting their industry in some way. Most stakeholders emphasized that these changes are more relative to new practices, technologies, and materials rather than sweeping changes that will dramatically alter an industry – or create new occupations. Michael Callanan, executive director of the NJATC, summed this up best, saying: “The core skills needed for green job opportunities are pretty much the same. You don’t need a new category of workers for green jobs. Our members have been working in and preparing for what are now called green jobs for many years.” In fact, stakeholders across industries explained that technological advances and new products have been evolving and changing these industries for many decades and that greening practices are part of this continuous evolution.

#### Example a

The UA provides an example of how the construction industry is evolving into greener practices. HVAC and plumbing technologies and processes have shifted the

“The focus on energy efficiency in the stimulus bill will have a huge impact on members in that many sheet metal members already have the skills to take advantage of green opportunities.”

– James Shoulders,  
Executive Administrator,  
International Training Institute  
for the Sheet Metal and  
Air Conditioning Industry

industry to gray water systems, low-flow fixtures, solar heating systems, and other new technologies and products. However the fundamental skills needed for installing these new components remain relatively unchanged.

**Example b**

SMWIA sees significant changes in areas such as service and refrigeration, HVAC commercial duct and air, control systems and testing, and adjusting and balancing. These industries will be affected by green technologies, but their related occupations will not radically change. The occupational changes involve new materials and technologies used to make the jobs more green.

**2. Observation: Key relationships with vendors, manufacturers, colleges, and research institutions keep industries on the cutting edge of green.**

Interviewed stakeholders work closely with vendors, manufacturers, and researchers to ensure that they are utilizing and training on the newest types of products. In fact, many stakeholders discussed their close relationships with these groups as a key element to staying ahead of the curve. Alternatively, these relationships give manufacturers a real-world scenario in which to test and develop materials. Under these joint relationships, manufacturers, vendors and stakeholders also work with education and research institutions to stay on the cutting edge of what is new in sustainable materials and technologies, so they can adapt their training in a specific occupation to meet this need.

**Example a.**

The UA is partnering with colleges in Michigan including Washtenaw Community College, Ferris State University, and the University of Michigan on proposed degrees under the sustainability technology category in plumbing, HVAC and sprinkler fitting.

**Example b.**

ABC works with manufacturers of green products and equipment to develop training on their installation and use. This is an on-going process that ABC employs to continually update its curriculum and processes.

**Example c.**

UBC is working with a leading green builder, Gerding Edlen (<http://www.gerdingedlen.com/>), to develop superintendent training for its members. Once trained, a superintendent is equipped to oversee and manage productive work sites that keep projects on time and within budget.

**3. Observation: Organizations are taking a dual approach in communicating the benefits, practices and social impacts of green by conducting outreach to existing members as well as using the push to green to aid in recruitment and retention of new workers.**

Many of the represented stakeholders recognize that perception of their industry is neither always positive (particularly with youth) nor generally thought of as green. Yet, the reality is much different. These organizations are at the forefront in our nation's push to be more energy efficient and more environmentally conscious through infrastructure, transportation, utility, and energy efficiency projects.

To this end, stakeholders are working to ensure that members understand and embrace the social and economic value of moving to green practices. They also emphasize that this push to green makes good business sense.

Additionally, many stakeholders' organizations are engaging in outreach campaigns to communicate the social and cultural impacts of these new greening processes. This outreach aids in recruiting new workers (often more socially conscious youth), changing the perception of the industry (to parents, teachers and other influencers), and allowing them an opportunity to showcase some of their organizational reuse and recycling activities.

**Example a.**

For UA, green means a shift to the use of equipment and technologies that recycle water rather than waste it, including low-flow fixtures, gray water systems and upgraded residential sprinkler systems. To raise awareness about green to its existing and potential workforce as it relates to HVAC and plumbing, the UA sponsors a green training trailer, the HVAC Mobile Green Classroom, that provides information on the latest green technology and hands-on training opportunities.

**Example b.**

NIMS has identified opportunities for its members to reclaim waste material and petroleum-based cutting fluids as they transition to water-based lubricants. It also sees the need to retrofit many of today's plants and look for more environmentally friendly waste reduction methods. Consequently, NIMS is reaching out to its workforce by developing the Green Principles of Precision Manufacturing to give its workforce a better understanding of the environmental impact of their work as well as the potential cost savings.

**B.****Stakeholder Assessment**

How is green changing occupations and occupational structures in these select industries?

**1. Observation: Industry leaders see future employment growth but minimal impact on existing occupational structures within their industries.**

Overall, when looking at the impact of green on occupations, the majority of the stakeholders emphasized that occupational structures would stay mostly the same, but include green overlays and enhancements to existing skills. Stakeholders recognized that some occupations may evolve slightly; for example, mechanics for the UPS fleet will need to be trained on hybrid vehicles, and seafarers may need to retrain operational staff on new environmental and waste management procedures. Traditional occupations such as carpenters, laborers, electricians, plumbers, roofers, sheet metal workers, HVAC mechanics and installers, electricians, equipment operators, and other familiar occupations in the skilled trades will also evolve and grow; however, the foundation skill requirements and experience will remain at the core of the occupation.

**Example a.**

Frederick Humphreys, president & CEO of HBI, expanded this point: “Most of the residential construction trades will be impacted. The skills of carpenters, electricians, plumbers, HVAC, and brick masonry will all change in some way and how they interact and affect each other will need to be coordinated. It's important

for existing occupations to look at the whole project and how one element affects the other rather than just focusing on just one green piece. Builders need to know green building practices in order to stay competitive. It’s about looking at what makes a house work more efficiently and applying new technologies.”

**Example b.**

While IEC believes the green emphasis will result in opportunities for its workers in a variety of sectors (solar, wind, hydrogenation, etc.), IEC’s Robert Baird, vice president for training and development, does not anticipate new occupations: “While I can’t say that creating a new occupation won’t happen; due to licensing requirements, I really don’t see the electrical work being done as part of a new occupation. Therefore, there would be little impact to IEC member contractors other than an expansion of their workload to include the electrical and mechanical aspects of alternative energy installations. At the same time, training requirements for electricians will be expanded to include whatever new technologies are introduced.”

**2. Observation: Entry opportunities in green jobs should lead to long-term, sustainable careers.**

Stakeholders emphasized that providing career paths for green jobs within the various industries will require allowing workers to learn the basic skills and crafts that an occupation requires, beyond simply looking at green aspects of that job. In doing so, stakeholders believe that this skilled workforce will be better prepared for long-term success, providing for many a sustainable pathway out of poverty.

**Example a.**

Several stakeholders mentioned concerns over the long-term sustainability of what is commonly referred to as weatherization occupations. Stakeholders in the building and construction trades generally see weatherization as a component of various occupations that play a role in both residential and commercial building. As such, they would like to see emphasis placed on the long-term commitment to an occupation and career track, rather than quick training on weatherization with no additional follow up to ensure that once these projects are completed workers will have skills for lasting employment.

**Example b.**

Another example is solar panel installation. Many stakeholders, including HBI/NAHB and UBC share the view that the skills required for solar panel installation should be incorporated into existing construction trades rather than evolving into a separate occupation. For instance, HBI/NAHB believes that “crafts should not become silos,” given that the work involved in one occupation will impact others as products change and installation procedures are revised to encompass green technologies.

“There should be quality and sustainability with regard to [green] job creation. Long-term jobs that offer career pathways and living wages, not short-term skill usage that leaves individuals with no career or stability.”

– John LeConche,  
Executive Director,  
Laborers-AGC (LIUNA)



## C. Stakeholder Assessment

### What are the key green opportunities for occupational growth in each of the selected industries?

#### 1. Anticipated occupational growth in select key industries will be driven by specific green trends and will vary geographically, leading to opportunities for targeted sector strategies.

There are key green drivers that will create opportunities in each industry for occupational growth. In many cases, geography and demographics play a large role in the market demands and subsequent response from the interviewed stakeholders. Key sectors of green will have a greater impact in geographical areas, such as solar in the South and wind in the Midwest. Investments in green, particularly from the ARRA, will have a significant impact on many of these industries. (For more information and examples, please see Appendix A, Table One: Opportunities, Challenges and Occupations.)

GREEN TREND	INDUSTRY IMPACTED
Weatherization	Building and Construction
Smart Grid Investments	Electrical Utility Building and Construction
Renewable Energy (Wind, Solar, Geothermal)	Building and Construction Electrical Utility
Waste Management	Transportation Advanced Manufacturing Building and Construction
Energy Auditing	Transportation Building and Construction Utility

Several key activities in the green economy will drive some industries to modify occupations or make adjustments to industry practices and processes. To the right is a snapshot of a few key areas that are likely to impact each of the represented industries in this scan.

#### Example a.

UBC, NECA/IBEW/NJATC, HBI/NAHB, SMWIA are all actively working in various capacities around solar panel installation, with different occupations (roofer, utility worker, sheet metal worker, electrician, laborer) all playing a crucial part in various commercial and residential applications.

#### Example b.

HBI/NAHB has identified energy rater/auditor as a likely new growth occupation. To a lesser extent, it sees potential for indoor air raters/auditors, water raters/auditors, green product consultants and construction efficiency consultants.

#### Example c.

While IUOE doesn't anticipate an abundance of new occupations, it has identified hybrid and diesel mechanics and jobs related to windmill farm work, GPS programmers, installers and maintenance providers on heavy equipment as possible new occupations that may result from the emphasis on green job creation.

**Example d.**

For residential construction markets, LIUNA has identified weatherization technician installers, supervisors, and energy auditors as new occupations. LIUNA also believes that supervisory positions in commercial construction that focus on ensuring the use of green principles and recordkeeping may evolve into their own occupations.

**Example e.**

For the Seafarers, the national and international maritime industry has increasingly become the focus of new environmental rules and regulations pertaining to oceans, rivers and bays. Consequently, the Seafarers believe that the green/environmental push will impact all seafaring occupations and have identified waterway trash collection, oil spill response, bilge and wastewater collection vessel jobs as well as safety/environmental officer positions as new occupations within its industry.

**2. More rapid occupational growth may be seen in industries focused on materials and technologies (manufacturing) as well as energy transmission (utilities).**

While job creation and occupational growth were not the primary focus of most of the interviewed stakeholders, both NIMS and UWUA see an immediate and significant need for new workers in their industries to meet rising market demand for their green products and services.

**Example a.**

NIMS anticipates that 1.6 million new jobs will be created. This demand will come from new products (such as Lithium batteries) as well as from existing skill shortages in precision manufacturing areas such as defense, medical and aerospace. According to NIMS Executive Director Stephen Mandes: “We (NIMS) have an opportunity to go from lean manufacturing to lean and green. Many green opportunities are technologically oriented. The nation’s precision manufacturing industry will lead the way in making the products and tools for the green economy. At the same time we are instilling a green culture in manufacturing processes in our training labs, shops and plants.”

“We will train people to build that [Smart Grid] system and operate and maintain that system through our training trust, so these are all opportunities for growth, for good paying , high-skilled jobs that can’t be off-shored.”

– D. Michael Langford,  
President, UWUA

**Example b.**

The UWUA has identified tremendous growth opportunities in jobs related to wind and solar generation as they relate to utility transmission and building the nation’s Smart Grid. One immediate example identified by UWUA was with the International Transmission Company, which is installing 3,000 miles of transmission lines to interconnect the new green energy coming from the West.

# V.

## THE IMPACT OF GREEN ON TRAINING AND EDUCATIONAL REQUIREMENTS

### Background

Throughout this section, stakeholders addressed how their industry's recruitment, training, and skill upgrading strategies are changing or adapting to green materials, processes, and new technologies. Questions were designed to highlight the breadth and depth of training and educational partnerships and practices in relation to the impact of green within their industries.

Consequently, stakeholder interviews explored several critical issues:

- How are organizations modifying training and education activities in relation to green jobs and green technologies for incumbent and future workers?
- What role will apprenticeship play in preparing skilled workers for green-collar job opportunities?
- What types of changes are being made to existing apprenticeship programs to accommodate the new emphasis on green skill sets and technology changes?
- What is the role and scope of pre-apprenticeship in relation to preparing the next generation of workers in the green economy?

### A.

#### Training & Educational Requirements

How are organizations modifying training and education activities in relation to green jobs and green technologies for incumbent and future workers?

1. **Observation: Stakeholders have a seamless approach to training their future workforce and updating the skills of existing workers to meet the market demand for green materials, processes, and technologies.**

Interviewed stakeholders expressed a few key points in relation to training and upgrading the skills of their new and existing workforces. First, stakeholders emphasized that their industries are constantly using new technologies and materials. Therefore, training is constant and seamless as most of their members embrace continual learning. Additionally, training materials are often developed once but delivered to three different audiences – through apprenticeship program curriculum, as stand-alone journeyworker upgrading classes, and sometimes as portions of specific training modules utilized in pre-apprenticeship training classes.

#### Example a.

UPS is up-skilling its existing mechanic workforce to handle lower-emission vehicles and incorporating green concepts and green principles into its training programs.

**Example b.**

NECA/IBEW/NJATC has developed renewable energy curriculum and updated both journeyworker upgrade and apprenticeship training materials, primarily in the solar and wind areas.

“We [LIUNA] develop new training programs, like Intro to Green, that provide added skills and expanded opportunities to journey-level workers and apprentices so they can remain competitive. Also, we continually update courses, including the addition of green processes and procedures to increase the knowledge and employability of our existing workforce.”

– John LeConche, Executive Director, Laborers–AGC, LIUNA

## **2. Stakeholders engage vendors, academic institutions, and Federal agencies to contribute to the training and research and development (R&D) efforts around new green technologies and materials.**

Due to the quick shifts in technologies and products in relation to the greening of occupations, many stakeholders partner with vendors to develop specific curriculum that address these changes as well as carry out some technical elements of training. These enhanced partnerships between RA programs and vendors speed the implementation of new technologies or the delivery of products into a rapidly changing marketplace. Additionally, some stakeholders work closely with university R&D programs and Federal agencies to develop innovations and products.

**Example a.**

UA collaborates with vendors to upgrade curriculum to ensure journeyworkers and apprentices stay current with the latest technologies. UA also works with colleges in Michigan (Washtenaw Community College, Ferris State University, and the University of Michigan) to develop sustainability technology degree programs and collaborates with partners to develop plumbing and safety codes.

**Example b.**

NECA/IBEW/NJATC partners with vendors and manufacturers to develop training for green products and technologies.

**Example c.**

UPS has partnered with the Environmental Protection Agency (EPA) and others to test a hydraulic hybrid urban delivery vehicle.



**B.****Training & Educational Requirements**

What role will apprenticeship play in preparing skilled workers for green-collar job opportunities?

**1. Observation: Registered Apprenticeship will continue to be the primary training vehicle for green-collar job opportunities for these select industries.**

By their very nature, Registered Apprenticeship programs (and the other training and education programs utilized by these stakeholders) continuously adapt to industry changes, technology enhancements and other market-driven needs. As the primary means of entry into these occupations, apprentices learn (through both classroom/online instruction and on-the-job learning) the latest industry practices to ensure that their training is relevant and meets the demands of the current marketplace.

**Example a.**

NECA/IBEW/NJATC is launching a core curriculum in which, after two years of core subjects, apprentices can pursue three years of related instruction in green tracks such as solar, wind, distributed controls, fuel cells, and other areas.

**Example b.**

UA has modified and developed training in areas such as gray water systems, low-flow fixtures, solar panels and sprinkler fitter systems, and has developed a green awareness certification program.

**Example c.**

ABC has added a 15-hour module to its apprenticeship curriculum that focuses on identifying green practices and increasing worker awareness of green concepts and principles. The module covers green products, waste management, and the basics of the Leadership in Energy and Environmental Design Green Building Rating System™, also known as LEED.

“Apprenticeship will continue to be the primary avenue to install industry practices in our workforce. Like the journey level training, it will be accomplished on a continual basis as curriculum and work practices expand and change.”

– William Irwin,  
Executive Director,  
UBC International  
Training Fund

**2. Registered Apprenticeship programs have the opportunity to conduct outreach and recruit an emerging group of young people with a heightened awareness of environmental sustainability issues.**

By communicating the cultural and social impacts of an occupation or industry, many stakeholders are better able to connect with socially conscious youth who are looking to make a difference. According to stakeholders, this is essential in reaching more qualified, skilled and energetic applicants for apprenticeship positions. In fact, stakeholders are already seeing applicants who are attracted to working in their industries because they see the impact their work will have on protecting and preserving the environment. Similarly, stakeholders are speeding efforts to educate current workers on the impact their jobs will have on ensuring environmental sustainability and their relationship to other green occupations. In addition to emphasizing the green impact of their industries, stakeholders are also utilizing new approaches to apprenticeship to ensure continued engagement.

**Example a.**

HBI/NAHB is appealing to new entrants by encouraging its apprenticeship programs to adopt a competency-based approach. Additionally, HBI/NAHB has embraced the use of interim credentials and is in the process of developing green interim credentials for its apprenticeship and pre-apprenticeship programs.

**Example b.**

NECA/IBEW/NJATC has modified the delivery of its curriculum by developing blended learning models that combine classroom and online instruction as well as approaches that allow for concentrations in different green sectors.

**C.****Training & Educational Requirements**

What types of changes are being made to existing apprenticeship programs to accommodate the new emphasis on green?

**1. Registered Apprenticeship programs are developing a variety of curriculum components based on green technologies, processes, and materials.**

The interviewed stakeholders have been developing green curriculum components for several years. As industry leaders and early adopters of new green practices, program sponsors are rapidly deploying training to their members that is relevant, timely, and green. Curriculum is being used for new and existing workers and continues to evolve with industry innovations.

**Example a.**

NIMS is developing the Green Principles of Precision Manufacturing and will integrate these principles into all training modules.

**Example b.**

The Seafarers have developed self-paced, online distance learning programs to meet training demands and offer certificates for the completion of Hazardous Material Control and Management and Environmental Awareness courses.

**Example c.**

SEIU has developed green building classes that cover energy usage, water conservation, green cleaning and maintenance, and a variety of other topics.

**Example d.**

HBI/NAHB has developed various green courses including Green Building for Building Professionals, Green Project Management and Advanced Green Building Science.

**Example e.**

LIUNA has created a comprehensive weatherization training program comprised of courses that teach the skills needed to become a weatherization technician, energy auditor or supervisor. Other courses in the program cover general construction, safety and environmental hazards, and life and employability skills.

**2. Registered Apprenticeship programs are taking advantage of new options available to program sponsors and utilizing a wide range of training methods to address greener practices, materials and technologies.**

The recently revised apprenticeship regulations (29 CFR Part 29 *Apprenticeship Programs, Labor Standards for Registration*) have provided opportunities for apprenticeship programs to expand training options such as competency-based and blended training programs. Additionally, interim credentials create greater opportunities for apprenticeship programs to develop specific green skill certifications within occupations. As such, program sponsors are developing a variety of innovative approaches to train new and existing workers. (For more information and examples, please see Appendix A, Table Two: Examples of Green Registered Apprenticeship Enhancements.)

**Example a.**

SMWIA is developing self-paced core curriculum training for its apprenticeship and other programs, therefore creating a more nimble approach that they believe will be more attractive to younger “millennial” workers.

**Example b.**

NECA/IBEW/NJATC is using a boot camp approach to journeyworker training focused on various aspects of green technologies.

**Example c.**

ABC employs technology-based learning and blended training models and offers online courses in HVAC, plumbing, electrical work, carpentry, and other areas. ABC also plans to put green training modules online and is in the process of developing an interim credential carpentry program.

**D.**

**Training & Educational Requirements**

What is the role and scope of pre-apprenticeship in preparing the next generation of workers for a green economy?

**1. Quality pre-apprenticeship or apprenticeship prep programs have significant potential to provide a sustainable pathway out of poverty and raise the skill level of disadvantaged and/or under-represented workers so they can adequately compete for apprenticeship positions and prepare for long-term careers.**

Many stakeholders collaborate with organizations to address pre-apprenticeship needs and skills in an effort to expand their outreach and diversity efforts. Common partners in stakeholder pre-apprenticeship efforts include Women in Apprenticeship and Non-Traditional Occupations (WANTO), YouthBuild, Emerald Cities Initiative, and JobCorps. These programs reach at-risk youth, women, minorities, and other hard-to-serve populations as well as veterans with special skills that are transferable to a variety of occupational areas. They also teach fundamental skills including math, science, writing and computer literacy, as well as soft skills such as customer service and more occupationally specific skills such as elements of weatherization.

**Example a.**

HBI/NAHB has developed a Pre-Apprenticeship Certificate Training (PACT) curriculum that is used by its various training programs as well as by YouthBuild. Remodeling, weatherization, lead paint abatement and other areas all present opportunities for pre-apprenticeship training.

**Example b.**

UWUA has two pre-apprenticeship programs in California and Massachusetts entitled “Intro to the Utility Industry.” In addition to the core curriculum, the program includes leadership development and diversity components. Comprised of mostly women and minorities, the program takes the participants through different sectors of the utilities industry.

**Example c.**

IUOE is an active partner in Hard Hatted Women’s Women in Ohio Roadways program and received a WANTO grant from DOL in July 2007. Consequently, a significant number of participants statewide were registered in IUOE’s apprenticeship program.

In its 2008 report, *Creating Gender Parity in Sector Initiatives*, Women Work! The National Network for Women’s Employment suggests that ensuring access to pre-apprenticeship training programs can provide the support women need in order to achieve not only parity in occupations, but economic security through apprenticeship employment.

**2. Many stakeholders identified a critical need to develop a framework for further linking pre-apprenticeship and apprenticeship to improve both consistency and quality while establishing clear expectations for the provider and the participant.**

Stakeholders agreed that by aligning pre-apprenticeship training programs with actual Registered Apprenticeship positions, workers can be guaranteed a career rather than just a short-term job. Many stakeholders expressed concern that boutique training providers within the green industry may offer the promise of immediate jobs (in areas such as weatherization) but will not provide the long-term skill development essential to ensure sustainable wages.

**Example a.**

The UA is an apprenticeship partner in the AFL-CIO’s new Emerald Cities Initiative that seeks to launch comprehensive building energy efficiency initiatives in urban centers across the country. Helmets to Hard-hats as well as UA’s Veterans in Piping Program and their Native American Program are all examples of outreach leading to career pathways in UA industries via apprenticeship.

**Example b.**

NIMS is proposing an approach that would allow pre-apprenticeship trainees to register with employers up front so that trainees can move more easily from pre-apprenticeship to apprenticeship programs.

**Example c.**

HBI/NAHB is developing green interim credentials for both its pre-apprenticeship and apprenticeship programs and green building modules for its pre-apprenticeship programs.

**3. There is an emerging need for multi-disciplinary pre-apprenticeship programs that address the commonalities of various industry needs around green.**

Stakeholders identified that a multi-disciplinary pre-apprenticeship program could focus on cross-occupational entry-level skills and green certifications. Multi-disciplinary programs cover a broad range of skills necessary to compete for apprenticeable occupations across the building and construction industries. Due to the emphasis on fundamentals, these programs increase the quality of applicants for apprenticeship programs and expose potential workers to the vast variety of occupations within the broader industry.



**Example a.**

NECA/IBEW/NJATC, in partnership with other labor management building and construction trade organizations, is developing a multi-disciplinary pre-apprenticeship program that will teach core skills (such as safety, math, blueprint reading, etc.) and allow students to explore occupations and ultimately enter into desired apprenticeship programs. This approach has been piloted in several cities and has been shown to be very effective.

**Example b.**

With a competency-based approach to apprenticeship, NIMS allows trainees to advance at their own pace along defined career ladders throughout the metalworking industry in a variety of occupations ranging from machinists and CNC (Computer Numerical Control) specialists to shift supervisors and manufacturing managers. For example, foundational coursework such as environmental quality, lean practices, and print reading can be applied to a variety of occupational specialties such as tool and die maker, CNC specialist or mold maker, allowing workers to capitalize on skill sets and move from one specialty to another.

# VI.

## STRATEGIC PARTNERSHIPS AND COLLABORATION TO MEET GREEN CHALLENGES AND OPPORTUNITIES

### Background

ETA continues to advocate greater partnership efforts between Registered Apprenticeship programs and both the workforce and education systems. These collaborations benefit all partners and increase options for job seekers. With the rising demands and expectations around green jobs, these partnerships will be an essential element to success. Partnerships and collaboration with Registered Apprenticeship have been encouraged in guidance released by ETA for implementation of the ARRA and is a key feature of the Green Jobs Act.

To accommodate the emphasis on green jobs and the movement to create a green-collar economy, interviewed stakeholders described partnerships and collaborations that provide training and educational opportunities, afford entry into RA programs, address workforce shortages, expand opportunities for disadvantaged populations, and leverage resources. Stakeholders also revealed that these collaborations enable them to expand the utilization of pre-apprenticeship programs and, in some cases, to re-employ dislocated workers. (For more information and examples, please see Appendix A, Table Three: Local Stakeholder Partnership Highlights.)

In this section, stakeholders revealed partnership activities as they relate to green jobs and green technologies. The questions they were asked were designed to capture specific re-employment partnership activities with declining industries, such as the automotive industry.

The interviews explored the following issues:

- What kind of partnerships are developing around green jobs and green technologies?
- To what extent are pre-apprenticeship partnerships being utilized or established to increase the pipeline of workers?
- What types of activities are occurring in an effort to retrain dislocated workers from other industries?

## A. Strategic Partnerships & Collaboration

### What kinds of partnerships are developing around green jobs and technologies?

#### 1. Stakeholders are partnering with national organizations and Federal agencies that seek to address diverse but shared policy interests around the emerging green economy.

As the focus shifts to a green economy and green-collar jobs, the regulatory framework around energy, environment, and transportation issues continues to evolve. Stakeholders have recognized the value and need for collaboration with national organizations and Federal agencies to address rapidly changing regulations, policies and standards as well as workforce and economic development efforts as they relate to green within their industries. Federal partners include the Environmental Protection Agency (EPA), Department of Energy (DOE), Department of Labor Occupational Safety and Health Administration (DOL-OSHA), and others.

We are engaged nationwide. We have over 350 Metalworking Technical Committees with at least three manufacturing companies on each; some with 12-18 companies. Our stakeholders have over 6,000 companies.”

– Stephen Mandes,  
Executive Director, NIMS

##### Example a.

ABC is partnering with the U.S. Green Building Council and Green Advantage, a green building environmental certification program, to develop training for its members.

##### Example b.

IEC is working with the North American Board of Certified Energy Practitioners to develop a partnership that supports the necessary training needed for energy certifications.

##### Example c.

LIUNA works on projects with the U.S. departments of Energy, Health and Human Services, Education and Transportation as well as with the Environmental Protection Agency, DOL-OSHA and the International Code Council to ensure they engage and stay abreast of regulatory and technological advancements.

##### Example d.

UA has developed a partnership with the International Association of Plumbing and Mechanical Officials (IAPMO) Standards Council which coordinates the development and adaptation of plumbing and mechanical codes to meet the specific needs of individual jurisdictions both in the U.S. and abroad.

#### 2. Stakeholders are partnering with start-ups and research and development hubs at universities to ensure that they are prepared for and training on the latest innovations within their industries.

The greening of industries and occupations happens in concurrence with innovation and product development. These innovations traditionally start at university R&D centers and business incubators. Interviewed stakeholders emphasized that relationships with these institutions are critical to their training and curriculum development needs. Through working with educational institutions, vendors and other key innovators, stakeholders are able to train and educate their members on the newest products, technologies and materials that are entering the market. (For more information and examples, please see Appendix A, Table Four: Stakeholder Educational Partnership Highlights.)

**Example a.**

Realizing that most of the materials for green equipment (e.g. wind turbines) come from Europe, UWUA is partnering with start-up companies in the U.S. to manufacture more of these products and develop subsequent training.

**Example b.**

UWUA is also partnering with community colleges and using them as a conduit to provide hands-on wind technician training and two-year associate degrees or college credit. For example, Iowa Lakes Community College offers a two-year Wind Energy and Turbine Technology Diploma Program. Other program examples that are shorter in duration (i.e. six months) can be found at Casper Community College in Wyoming and at Kalamazoo Valley Community College. These programs are sometimes modeled after wind technician programs in Europe.

### 3. Stakeholders partner with a variety of national advocacy groups and community-based organizations for training, education and recruitment needs as well as broader social goals.

In addition to policy and educational partnerships, stakeholders also engage in a variety of partnerships designed to ensure that various groups unite over shared advocacy interests related to green rather than splintering over unique policy goals. Also, many partnerships focus on recruitment, education, foundational skills training and development (i.e. pre-apprenticeship) to expand access to Registered Apprenticeship opportunities for under-represented populations.

**Example a.**

NECA/IBEW/NJATC works with the Green Jobs Alliance, a consortium of organizations whose goal is to provide education, green jobs training, job placement and green workforce development.

**Example b.**

SEIU works with many groups including the Apollo Alliance, Green for All and the Blue Green Alliance.

**Example c.**

UWUA works with the Center for Energy Workforce Development (CEWD) on career paths for people in the energy industry. UWUA also works with the Advanced Center for Community, Opportunity, Resources and Development (ACCORD), a group that provides access to training and career path opportunities in high-growth industries to fund its Introduction to the Utility Industry pre-apprenticeship program.

**Example d.**

HBI/NAHB is working with YouthBuild as well as the Hispanic Heritage Foundation on a management track internship program in the home building industry for Hispanic youth. HBI/NAHB is also working with the NAACP on advocacy issues as it relates to affordable housing.

“The crafts that the UA represents have always been at the forefront of education and training as it relates to environmental friendly applications and systems. As such, we work with many organizations on training initiatives that enhance the skills of our workforce so they can compete for quality jobs in the HVAC and plumbing industries.”

– Michael Arndt,  
Director of Training, UA

## **B.** **Strategic Partnerships & Collaboration**

### How and to what extent are pre-apprenticeship efforts and collaborations being used to increase the pipeline of workers for green jobs?

#### **1. Localized pre-apprenticeship training partnerships (some with green elements) are increasingly crucial to preparing applicants for Registered Apprenticeship programs.**

Many stakeholders are capitalizing on existing linkages with partners such as the workforce system, labor/management consortiums, business collaborations, private industry institute programs, education, military and community-based organizations as a way to expand their outreach and recruitment efforts. Pre-apprenticeship partnerships often address baseline skills necessary to afford participants an opportunity to compete and secure positions with Registered Apprenticeship programs.

Most of the stakeholders interviewed have a variety of programs to address these pre-apprenticeship needs.

##### **Example a.**

SMWIA's Local 18 in the Milwaukee/Racine area of Wisconsin works with the Partnership for Working families, a national organization devoted to developing and promoting innovative strategies to build community power and reshape regional economies.

##### **Example b.**

HBI/NAHB associations in St. Louis, Jacksonville, Fla., and Lexington, Ky., have developed relationships with local corporations, community colleges, the workforce system and high schools to develop apprenticeship programs that result in credit toward associate and bachelor's degrees. Moving forward, green building practices and interim credentials will be incorporated into program curricula.

##### **Example c.**

In Long Beach, Calif., the UWUA is working with the Pacific Gateway Workforce Investment Network to create workforce groups in local one-stops that target green jobs.

##### **Example d.**

While their pre-apprenticeship programs use pieces of apprenticeship curriculum training right now, by December 2009, UBC will have specific pre-apprenticeship curriculum that can be customized to align with the needs of specific pre-apprenticeship programs.

#### **2. Pre-apprenticeship programs showcase the many green elements that exist in these occupations and provide an opportunity to further connect with (and recruit) a more socially/environmentally conscious workforce.**

Pre-apprenticeship often utilizes course modules and curriculum from existing Registered Apprenticeship programs. As such, these green curriculum components highlight the social and environmental impacts of the skilled trades occupations and serve as very powerful tools in recruiting talented workers (especially youth) into an industry. Additionally, pre-apprenticeship exposes workers to different occupations/tracks within the industry, which aids the worker in selecting the right occupation for a long-term career.

##### **Example a.**

Pre-apprenticeship programs will play an integral role in the Emerald Cities Initiative, an initiative resulting from a coalition of labor unions, community organizations, green jobs advocates, and others that will plan,



launch and coordinate comprehensive projects to retrofit America’s urban building stock for greater levels of energy efficiency. Initially, the project will target select cities where a model program will be developed, tested and refined and then replicated elsewhere.

**3. While interest is growing among green advocacy groups for more pre-apprenticeship opportunities, stakeholders prefer a more formalized structure for pre-apprenticeship that would establish clearer expectations and direct linkages with Registered Apprenticeship programs.**

The link between pre-apprenticeship and Registered Apprenticeship needs to be strengthened to ensure that existing career pathways are being utilized. Stakeholders routinely referred to concerns over boutique training providers in areas such as weatherization and solar installation. Their concerns are centered on the lack of long-term career potential in these areas unless accompanied by a formal pathway through an apprenticeship program.

**Example a.**

Many stakeholders are beginning to address this concern by building consortiums such as the Emerald Cities Initiative, which is using a multi-disciplinary training curriculum that directly relates to a variety of apprenticeable occupations.

**Example b.**

HBI/NAHB has developed Pre-Apprenticeship Certificate Training (PACT) curriculum used by its various training programs as well as by YouthBuild. Remodeling, weatherization and lead paint abatement all present opportunities for pre-apprenticeship training.

**C. Strategic Partnerships & Collaboration**  
**What types of activities are occurring in an effort to retrain dislocated workers from other industries?**

**1. While most stakeholders are focused on the re-employment of their existing members, there are isolated examples of re-employment efforts that could be expanded.**

When questioned about their involvement in reaching out to dislocated workers from other industries, most respondents acknowledge little or no activity due in part to the need to focus on getting their own constituents back to work. Due to economic conditions, many industries have long out-of-work lists and feel their priority is to get their members back to work first. In addition, many stakeholders expressed continued difficulty in establishing long-term and significant partnerships with the workforce development system. Some stakeholders described active re-employment efforts that ranged from chapter/local initiatives to robust recruitment efforts.

**Example a.**

UBC sees significant opportunities for re-employment in solar panel installation, an occupation that requires a great deal of welding. Consequently, UBC is actively recruiting dislocated welders from other industries and preparing them for job opportunities in the solar sector.

**Example b.**

ABC is kick-starting localized efforts to recruit the unemployed and under-employed. For example, in South Carolina the ABC chapter is looking to retrain auto industry workers for work in the construction

industry. Additionally, ABC national has developed a skills assessment tool to help dislocated workers find re-employment opportunities that align with their expertise.

**Example c.**

SMWIA has limited capacity to re-employ dislocated auto industry workers where the United Auto Workers union has a significant presence.

**Example d.**

SEIU’s Public Services Division is developing plans to re-employ dislocated park service employees in landscaping, roofing, and water management jobs in public buildings.

**Example e.**

UWUA is working to transition dislocated workers from the auto and aerospace industries into various jobs including auditor, cable splicer, overhead lineman, and weatherization technician positions.

## **2. Many stakeholders are engaged in veteran re-employment activities.**

Many stakeholders are actively engaged in the Helmets to Hardhats initiative, which is a national program that connects National Guard, Reserve, and transitioning active-duty military members with quality career training and employment opportunities within the construction industry. Additionally, some stakeholders have other partnerships that are geared to former military personnel and serve as an opportunity to re-employ this population back into the workforce after their terms of service are complete.

**Example a.**

The UA has developed a Veterans in Piping (VIP) program. Many of their locals also participate in pre-apprenticeship training activities with local area partners.

**Example b.**

Several of the stakeholders including UA, LIUNA, UBC, SMWIA, IBEW and IUOE participate in Helmets to Hardhats.

## VII. CONCLUSION

The industries represented within this report have long been pillars of the American economy, while their related occupations have provided the cornerstones of sustainable employment that supported the growth of the nation's middle class. These same industries are also now poised to be at the forefront of the emerging green economy. Within these industries, key occupations are emerging as in-demand careers for our shifting economy. Carpenters, mechanics, utility workers, laborers, roofers, and other existing occupations make up many of the green jobs that could materialize in the coming months and years as the green economy gains momentum as a result of investments made by the ARRA.

This shift is driving industry to constantly evaluate the relevant skills, knowledge and abilities necessary to succeed in a competitive economy as well as how to ensure this knowledge is transferred to both their incumbent and new workforce. While many of the occupations that support the green economy will remain the same, some skills necessary to implement new materials, processes and technologies are changing at a rapid pace. Registered Apprenticeship, with its strong industry relationships that ensure apprenticeship standards meet industry specifications, remains the primary entry into these skilled industries through labor management organizations, employer associations, and private businesses. As occupations progress to meet changing market demands, the curriculum and training that occurs through Registered Apprenticeship adapts as well. Additionally, organizations with Registered Apprenticeship programs are able to train their existing workforces—or journeyworkers—with many of the same modules used for apprentices. They can also repurpose many foundational components of their Registered Apprenticeship programs to create basic pre-apprenticeship training.

The interviewed organizations recognize the power and scalability of Registered Apprenticeship that provides apprenticeship the ability to easily expand to meet the possible demands of emerging green industries and occupations. Throughout this report, numerous observations were made based on an aggregation of various comments of information provided by stakeholders. We conclude this report with the following essential findings based on a summary review of those high level observations.

### 1. **Green has had, and will continue to have, a significant, positive and adaptive impact on industries and occupations studied in this report.**

The interviewed stakeholders acknowledged that green is a reality in today's marketplace. They expressed that green is rapidly changing many of today's existing industries and occupations as they embrace new technologies, processes and materials. While the foundation of most occupations remain relatively unchanged, skill



enhancements are currently being deployed to apprentices and journeymen alike. Additionally, organizations are proactively partnering with start-ups, manufacturers, university R&D laboratories, business incubators and others to ensure that new and emerging innovations around green can enter the marketplace with ease and agility. These partnerships allow stakeholders to keep their members on the cutting edge of rapidly changing technological advancements within their respective industries.

The represented industries recognize that their involvement in sustainable building, energy efficiency, alternative energy, transportation and utility projects have also created an opportunity to appeal to a new set of socially conscious workers—mainly youth. This shift in image will aid stakeholders in attracting and retaining the next generation of workers in their industries.

## **2. Policies and investments in green jobs should lead to long-term, sustainable careers with emphasis on building America's middle class.**

Once the foundation of the American economy, the middle class has decreased in size and scope over the last several years. However, investments in rebuilding America's middle class are at the forefront of the ARRA and other Federal, state and local investments. Most of the interviewed stakeholders have long provided middle class careers to Americans by emphasizing family-sustaining wages and benefits for all workers. Throughout the interviews, stakeholders emphasized



the need to ensure that opportunities in the green economy have long-term career potential and pathways to get-and stay-out of poverty. These pathways must include training, education and workplace opportunities beyond immediate needs and incorporate the fundamental training in an occupation that leads to life-long careers with competitive wages. As such, stakeholders would like to see investments that focus on supporting sustainable careers (carpenter, electrician, etc.), rather than focus on short-term skills (weatherization, wind generator technician) that don't have long-term benefits as stand-alone skill sets. Additionally, stakeholders spoke of the costs and efforts relating to creating and revising curriculum and retraining instructors on new green technologies. Investments in already established and scalable training programs—such as Registered Apprenticeship programs—will be deployed rapidly and seamlessly to workers across the country.

## **3. Registered Apprenticeship is at the nexus of the green economy.**

Registered Apprenticeship serves as the primary means to enter many of the crucial occupations that will make up the green economy. From green building occupations to utility workers to renewable energy installers and technicians to hybrid mechanics and others, green jobs are often apprenticeable occupations that come with





vigorous training, hands-on learning, long-term career paths and good, sustainable wages. Registered Apprenticeship programs are built to ensure that worker credentials are recognized nationwide and that apprentices earn while they learn critical career skills.

Since most workers within an occupation go through the apprenticeship training, organizations continually update both the training components (as products and technologies change) and the delivery of training. The very nature of apprenticeship programs is to enable employers to develop and apply industry standards to paid training programs that can increase productivity and improve the quality of the workforce. Each Registered Apprenticeship program has an established process that continually engages employers, educators, manufacturers, and others to ensure that curriculum and training meets current and future needs. The infrastructure surrounding these Registered Apprenticeship programs allow organizations to seamlessly address new components, skills and other areas that will emerge with the green economy.

#### **4. In order to meet rapidly changing market demands, Registered Apprenticeship stakeholders are taking advantage of newer, more flexible training approaches.**

Historically, Registered Apprenticeship programs relied on a classroom setting for delivering curriculum theory to the apprentices. However, Registered Apprenticeship stakeholders now have the ability to deliver just-in-time training to meet the adult learning styles of today's workforce. Registered Apprenticeship serves as a unique and adaptable model that can include interim certifications, distance learning, electronic media and various hybrid/combination training models that serve the needs of both industry and the incoming workforce. The enhanced delivery of curriculum allows for further adaptability of course material and allows for more efficiency in modifying training to accommodate new trends and innovations in an industry. As such, many stakeholders have already developed modules, curriculum and interim certifications around green materials, products and technologies. These training components are being utilized with apprentices and journeyworkers (and in some cases even those engaged in pre-apprenticeship training) and are often developed in conjunction with manufacturers who have developed the products.





**5. Pre-apprenticeship programs and clearly defined occupational career ladders can provide pathways out of poverty and further engage traditionally hard-to-reach populations in the green-collar economy.**

Registered Apprenticeship programs require applicants to have many foundation-level skills in reading, math, science and technology as well as “soft” skills and safety applications. As such, some applicants fall short in meeting the minimum requirements for apprenticeship opportunities. Pre-apprenticeship programs that directly connect to apprenticeship positions can provide gateways for hard-to-serve populations (minorities, women, Native Americans, at-risk youth) to enter many of these industries. In turn, employers and organizations are



more likely to engage applicants who have successfully completed pre-apprenticeship programs when opportunities arise. Interviewed stakeholders confirmed that creating a framework to further link pre-apprenticeship and Registered Apprenticeship could address several gaps and establish a more formal process for pre-apprenticeship program participants. By establishing strong links with Registered Apprenticeship programs, pre-apprenticeship programs can afford applicants an opportunity to view a variety of career ladder opportunities with an industry. Furthermore, stakeholders also acknowledged that a multi-disciplinary pre-apprenticeship approach around green could have several benefits. These benefits include: exposing a worker to a variety of industries prior to long-term commitment to an apprenticeship program; addressing skills and materials that are specific to green within the building and construction trade occupations; and further ensuring that pathways out of poverty are sustainable in the 21st century economy.

**6. New and innovative partnership models have evolved in order to embrace the changing needs of our global and green economy.**

For over 70 years, Registered Apprenticeship stakeholders have engaged in a variety of partnerships with academia, manufacturers, vendors and others. However, as the pace and demands of the green economy increase, new partnership models are emerging. Registered Apprenticeship programs are finding shared goals and interests with advocacy groups, Federal agencies, universities, community-based organizations and other national not-for-profit organizations. Partnerships stem from a variety of sources and needs, including multi-disciplinary



training partnerships, industry standards, innovation, economic and workforce development, business incubation, and policy. Some of these partnerships, such as the Blue-Green Alliance, focus on expanding the quantity and quality of jobs in the green economy, while others, such as the Emerald Cities Initiative, focus on multi-disciplinary pre-apprenticeship training. The rapid pace of innovation and change within industries has opened up possibilities for partnerships beyond traditional approaches. As green forces in industry continue to emerge, stakeholders expressed openness to exploring new collaborations that aid in rebuilding America's middle class.

Additionally, some stakeholders have begun to look at ways to partner with organizations around re-employment activities. These organizations could serve declining industries or returning veterans. These emerging models emphasize how changing economic conditions create opportunities for creative solutions.

## **7. Great opportunities exist for widespread, systemic partnerships between Registered Apprenticeship and the education and public workforce systems.**

Partnering is a natural and inherent element to Registered Apprenticeship. The lack of scalable workforce system partnerships expressed by stakeholders suggests that the full potential of these partnerships have yet to be realized. However, an increased emphasis from the interviewed stakeholders on pre-apprenticeship combined with the workforce system's need for scalable training in green jobs indicates that an opportunity exists for further collaboration. Bridging the workforce system and Registered Apprenticeship gap could address the critical need to provide pathways out of poverty while providing career ladders that lead to the middle class. Furthermore, emerging partnership efforts that support transitioning dislocated workers and veterans into emerging green jobs could be expanded.



In conclusion, policies and investments supporting green jobs are having a significant impact on industries and occupations that utilize Registered Apprenticeship. Registered Apprenticeship, in return, is now positioned to be a critical driver in meeting the needs of the emerging green economy. Additional program options, including enhanced support for pre-apprenticeship and greater partnerships with the workforce system, should also be considered by Federal, state and local policy makers. Finally, this report can also serve as a resource to education and workforce development professionals seeking to understand and partner with the Registered Apprenticeship system around green jobs. ETA and OA will continue to provide technical assistance to support partnerships that can meet the demands for green jobs. This report and the accompanying resources will be available online and disseminated to stakeholders of both the Registered Apprenticeship and workforce systems.

## VIII. APPENDICES

### Summary

Appendix A provides easy reference to the report's tables and charts that highlight what the stakeholders view as the challenges and opportunities presented by the emerging green economy and focus on green jobs. This appendix also provides a snapshot of green-oriented training enhancements and partnerships.

In order to expand the scope of views on the growth of green jobs and the creation of green occupations, the report includes a brief literature review and other supporting documents in Appendix B. These materials highlight the perspectives of environmental advocacy groups and other decision-makers who have not traditionally been involved in Registered Apprenticeship, but who have articulated various strategies designed to stimulate the economy and ensure environmental sustainability. In some cases the views of these groups recognize apprenticeship as critical to the nation's economic recovery and reflect a combination of stakeholder opinions that emphasize the need to re-skill workers within existing jobs while opening the door to new occupations.

Appendix C presents the original environmental scan questions used to guide the interviews with stakeholders conducted in March and April 2009. Appendix D provides a sampling of green job training and education programs offered through Federal, state, and local agencies and organizations. Appendix E is a listing of all resources used in developing this report.

### Appendices A and D: Tables

- Opportunities, Challenges, and Occupations
- Examples of Green Registered Apprenticeship Enhancements
- Local Stakeholder Partnership Highlights
- Stakeholder Educational Partnership Highlights
- Green Job Training and Education Programs

### Appendix B: Supplemental Literature

- *Green Jobs: A Pathway to a Strong Middle Class*
- *Green-Collar Jobs in the U.S. and Colorado*
- *Green Jobs Guidebook: Employment Opportunities in the New Clean Economy*
- *Green Recovery: A Program to Create Jobs and Start Building a Low-Carbon Economy*
- *Green-Collar Jobs in America's Cities: Building Pathways Out of Poverty and Careers in the Clean Energy Economy*

### Appendix C: Interview Questions

Questions on industry collaboration and partnerships, re-employment, and needs and opportunities

### Appendix E: Report Resources

- Interviewed Stakeholders
- Green and Sustainability Advocacy Organizations
- Job Training and Grant Programs
- Workforce and Economic Development Organizations
- Federal Agencies
- Legislation
- Stakeholder Education Partners
- Stakeholder Private Sector Business Partners
- Advocacy Organizations
- Certification and Standards Organizations

### Appendix F: ETA's Draft Green Jobs Framework for Action

## APPENDIX A: TABLES AND CHARTS

**Table 1. OPPORTUNITIES, CHALLENGES, AND OCCUPATIONS**

PROGRAM SPONSOR	OPPORTUNITIES	CHALLENGES	NEW/EMERGING OCCUPATIONS
ABC	Green training modules; adapting training to new technologies; and re-classification of existing jobs	Funding for pre-apprenticeship programs	No new occupations anticipated
HBI/NAHB	"Greening out" work done by contractors, superintendents, and its general skilled, semi-skilled, and entry-level trade workforce; green remodeling sector; and pre-apprenticeship training	Evolving skill sets of various occupations and ensuring that training providers follow LEED and NAHB standards	Solar panel installer; geothermal installer; and energy raters/checkers
IEC	Solar, wind and hydro-generation work; proposed low-voltage apprenticeship with green training modules; and two-year technician programs	Defining green and determining whether workers need distinct certifications for green work	No new occupations anticipated
IUOE	Building maintenance (stationary engineers) and HVAC systems	Recruiting more apprentices and continuous training for journeyworkers	Hybrid mechanic and wind-mill farm occupations
LIUNA	Weatherization; rehabilitation; environmental abatement; commercial green roofing; windmill farm work; and demolition	Funding; instructor training; curriculum development; and educating its workforce on how energy efficiency impacts their jobs	Tech installer; energy auditor; and supervisory positions
NECA/IBEW/NJATC	Renewable energy; Smart Grid; and energy efficiency	Differing definitions of green and communicating that green job opportunities involve a tweaking of existing skills, not new skills	No new occupations anticipated
NIMS	Shift to a "lean and green" culture; reduction of petroleum-based cutting fluid usage; retrofitting power plants; and waste reduction	Understanding of environmental impacts on power plant production; lack of trained instructors; and funding	Occupations related to lithium battery manufacturing
Seafarers	Oil pollution; gray water discharge; and ballast water discharge	Environmental regulations and standards set at the international and national levels	Port trash collection, oil spill response, bilge, or wastewater collection vessel worker; and safety/environmental officer
SEIU	Carbon emissions reduction; energy efficiency; weatherization; and water conservation	Getting employers to up-skill their workforces in green technologies	Building/energy auditor and green environmental services worker
SMWIA	Service and refrigeration; air ducts and control system work; green building/energy auditors; weatherization; solar panel installation; and wind turbine work	Impending retirement of a significant percentage of sheet metal workers	No new occupations anticipated



**Table 1. OPPORTUNITIES, CHALLENGES, AND OCCUPATIONS, cont'd**

PROGRAM SPONSOR	OPPORTUNITIES	CHALLENGES	NEW/EMERGING OCCUPATIONS
UA	Installation of new low-flow fixtures, gray water systems, solar heating, and residential sprinkler systems	New technology and processes; and evolving HVAC and plumbing occupations (also an opportunity)	Green auditor/inspector occupations
UBC	Wind power and solar panel installation	Up-skilling existing workforce	No new occupations anticipated
UPS	Enhancing mechanic training; and up-skilling existing mechanic workforce to operate lower-emission vehicles	Lack of instructors (to teach new green-oriented curriculum); and funding	Package dispatch supervisor
UWUA	Wind and solar power generation; Smart Grid; and opportunities for existing occupations (e.g. nuclear control room operators, maintenance repair workers, etc.)	Getting grant funding to jump start re-employment and re-training efforts	Transmissions occupations; wind technician; wind mechanic; weatherization technician; and solar panel installer

**Table 2. EXAMPLES OF GREEN REGISTERED APPRENTICESHIP ENHANCEMENTS**

ORGANIZATION	RA ENHANCEMENTS	TYPE OF PROGRAM	NOTES
ABC	Technology-based learning and hybrid models; online courses in HVAC, plumbing, carpentry, and other areas; and online green modules (pending)	Online curriculum, hybrid training	N/A
HBI/NAHB	Integration of green concepts, principles, and standards in training programs; and growing adoption of a competency-based approach to apprenticeship	Interim credentials, competency-based training	Green building practices and interim credentials will be incorporated into HBI/NAHB program curricula
IEC	Expanding basic training in solar, wind, etc., through the addition of green continuing education units.	CEUs, interim credentials	IEC anticipates revising its curriculum as necessary to support new technologies and creating interim credentials for work in green technologies
LIUNA	Aligning apprenticeship programs to accommodate the emphasis on green jobs	Core curriculum, interim credentials, new training modules, CEUs	LIUNA curriculum is accredited by an independent third party entity
NECA/IBEW/NJATC	Blended-learning model that combines classroom instruction and web-based learning; and interim credentials	Hybrid training, core curriculum, interim credentials	IBEW is rolling out a new core curriculum that offers apprentices three years of related instruction in different green tracks



**Table 3. LOCAL STAKEHOLDER PARTNERSHIP HIGHLIGHTS**

ORGANIZATION	LOCATION	DESCRIPTION	TYPE
HBI/NAHB	St. Louis; Jacksonville, Fla.; and Lexington, Ky.	Partnership between HBI/NAHB associations and various groups to develop apprenticeship programs resulting in credit toward associate's and bachelor's degrees	Local corporations, community colleges, the workforce system, and high schools
SMWIA	Milwaukee/Racine, WI area	Partnership between Local 18 and the Partnership for Working Families to "build community power and reshape regional economies"	Community-based organization
UWUA	Long Beach, CA	Works with the Pacific Gateway Workforce Investment Network to create workforce groups in local one-stops to target green jobs	Workforce system, non-profit
UWUA	Various locations in the United States	Works with various community-based organizations to target women for work in non-traditional occupations, develops programs for older and younger workers, and facilitates connections with the workforce system through its Intro to the Utility Industry pre-apprenticeship program	Community-based organization
UWUA	Michigan	Partners with a consortium of nine community colleges on training and curriculum development	Workforce system, community colleges, community-based organizations

**Table 4. STAKEHOLDER EDUCATIONAL PARTNERSHIP HIGHLIGHTS**

ORGANIZATION	DESCRIPTION	TYPE OF PROGRAM
HBI/NAHB	Offers professional designations to its members through its University of Housing and has several partnerships with four-year institutions	In-house education arm and colleges/universities
IUOE	Uses the National Labor College format to improve instructor training and has partnerships with other colleges to offer apprentices two-year associate degrees	In-house, community colleges
LIUNA	Partners with various schools and vocational and technical high schools	K-12, community colleges
NECA/IBEW/NJATC	Works with the American Council on Education to provide college credit to IBEW apprentices	Four-year institutions and community colleges
NIMS	Works with high schools and community colleges to accredit their training programs to NIMS standards	K-12, community colleges
UA	Works with Washtenaw Community College, Ferris State University, and the University of Michigan on proposed sustainability technology degree programs	Blended—community and four-year colleges
UWUA	Works with community colleges to target green jobs in the wind energy and hydro industries	Community colleges
UWUA	Encourages younger workers who graduate from UWUA programs to work with high school students on conservation projects in an effort to create a pipeline of new workers	K-12

## APPENDIX B: RESOURCES AND REPORTS

In addition to compiling stakeholder viewpoints on the call for wide-scale, green-collar job creation, the Office of Apprenticeship also reviewed the literature of the White House Task Force on the Middle Class and high-profile advocacy groups to highlight their views on the role green jobs and/or apprenticeship should play in the nation's economic recovery and efforts to ensure environmental sustainability.

### The White House Task Force on the Middle Class; *Green Jobs: A Pathway to a Strong Middle Class*, March 2009



#### Report Excerpt

“Green jobs have the potential to be quality, family-sustaining jobs that also help to improve our environment. They are largely domestic jobs that can’t be off-shored. They tend to pay more than other jobs, even controlling for worker characteristics. Moreover, green jobs are an outgrowth of a larger movement to reform the way we create and use energy in both this country and the rest of the world. They represent a growth sector, and one that offers the dual promise of providing good jobs while meeting the environmental challenge to reduce our dependence on finite fossil fuels that generate harmful carbon emissions.” (Page 1)

#### Key Findings

“Because definitions of green jobs are so broad at this point in time, it is impossible to generate a reliable count of how many green jobs there are in America today. We can, however, identify jobs in industries and occupations that are likely to be green jobs. Characteristics of green jobs:

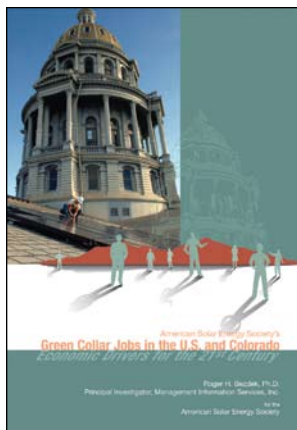
- Green jobs are good jobs: they pay more, by 10 to 20 percent, depending on the definition, than other jobs.
- Green jobs are more likely to be union jobs than other jobs.
- Green jobs are more likely to be held by men, but less likely to be held by minorities or urban residents, and addressing this will be a significant challenge.
- It will take considerable outreach to make the opportunity to work in a green job widely available ...” (Page 2)

\*\*The White House report also includes an analysis of jobs in green occupations in likely green industries (pages 32-33) as well as an analysis of the characteristics of green jobs and the people that work in them (page 6).

Source: [http://www.whitehouse.gov/assets/documents/mctf\\_one\\_staff\\_report\\_final.pdf](http://www.whitehouse.gov/assets/documents/mctf_one_staff_report_final.pdf)

#### Apprenticeship Highlights

The report highlighted apprenticeship as one of several “extensive labor force intermediaries, including community colleges, union apprenticeship programs, and public/private training programs to serve as a linkage between employers and workers.” (Page 3)



## **American Solar Energy Society; *Green-Collar Jobs in the U.S. and Colorado, January 2009***

### **Report Excerpt and Key Finding**

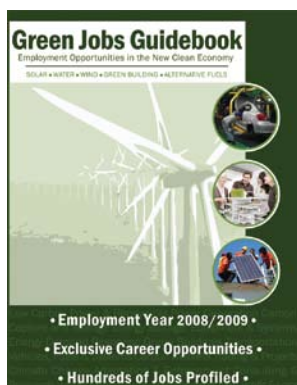
“If U.S. policymakers aggressively commit to programs that support the sustained orderly development of RE&EE, our national prospects look even brighter. According to research conducted by the American Solar Energy Society (ASES) and Management Information Services, Inc. (MISI), the renewable energy and energy efficiency industry could—in a crash effort—generate up to \$4.3 trillion in revenue in the United States and create more than 37 million jobs by the year 2030. These 37 million jobs would represent nearly one out of every four jobs in 2030, and many would be jobs that could not easily be outsourced.” (Page viii)

### **Additional Report Excerpts**

“We found that, in 2007, the U.S RE&EE industries generated more than \$1 trillion in sales and created more than 9 million jobs—including \$10.3 billion in sales and more than 91,000 jobs in Colorado. U.S. RE&EE revenues represent substantially more than the combined 2007 sales of the three largest U.S. corporations—Wal-Mart, ExxonMobil, and General Motors (\$905 billion).” (Page 4)

“We also found that RE&EE industries are growing faster than the average U.S. industry and comprise some of the most rapidly growing industries in the world, including wind, photovoltaics (PV), fuel cells, recycling/remanufacturing, and biofuels. Except for hydropower and industry biomass, the RE U.S. energy contribution is still small, although it is growing rapidly.” (Page 4)

Source: [http://www.ases.org/images/stories/ASES/pdfs/CO\\_Jobs\\_Rpt\\_Jan2009\\_summary.pdf](http://www.ases.org/images/stories/ASES/pdfs/CO_Jobs_Rpt_Jan2009_summary.pdf)



## **Environmental Defense Fund; *Green Jobs Guidebook: Employment Opportunities in the New Clean Economy, October 2008***

### **Report Excerpt**

“A large portion of the green jobs profile in the Guidebook is found in the traditional employment sectors of manufacturing, installation, fabrication and operations. Other opportunities exist in both urban and rural settings within industry sectors like green buildings, renewable energies, energy efficient auditing, power plant operations, facilities management and farming.” (Page 1)

### **Key Findings**

The guide provides:

- Profiles of 200 green jobs currently in California

### **Apprenticeship Highlights**

“... The duration of the apprenticeship is typically between three to five years based on the skills and trade being learned. At the start of the apprenticeship, the worker may earn between \$9 and \$14 per hour. Once completed, the apprentice-turned-craftsman can earn more than \$30 an hour.” (Page 47)

- Details on 45 job types for high school grads, many paying over \$25 per hour
- Information on job training and placement programs
- Listings of valuable apprenticeship programs (Executive summary)

\*\*The Green Jobs Guidebook also includes detailed green career pathway maps for the East San Francisco Bay Area. (Pages 54-55)

Source: [http://edf.org/documents/8489\\_Green%20Jobs%20Guidebook%20FINAL%20with%20cover.pdf](http://edf.org/documents/8489_Green%20Jobs%20Guidebook%20FINAL%20with%20cover.pdf)

"Most apprenticeship programs are either run through a labor union, large company like an electric utility (for the purpose of placing the worker in that company), or a local college. Typically, applicants to apprenticeship programs must be 18 years of age, in good physical health, possess a high school diploma or a GED, and able to read, write and speak English." (Page 47)



### **Center for American Progress (via Blue Green Alliance); *Green Recovery: A Program to Create Jobs and Start Building a Low-Carbon Economy, September 2008***

#### **Report Excerpt**

"... new job activities would certainly be created by building a green economy. Some of these jobs will be in specialized areas, such as installing solar panels and researching new building material technologies. But the vast majority of jobs are in the same areas of employment that people already work in today, in every region and state of the country. (Page 5 of the full Center for American Progress report: [http://www.americanprogress.org/issues/2008/09/pdf/green\\_recovery.pdf](http://www.americanprogress.org/issues/2008/09/pdf/green_recovery.pdf))

#### **Key Findings/Highlights**

"... This paper shows the impact of a swift initial investment in climate solutions that would direct funding toward six energy efficiency and renewable energy strategies:

- Retrofitting buildings to increase energy efficiency
- Expanding mass transit and freight rail
- Constructing "smart" electrical grid transmission systems
- Wind power
- Solar power
- Advanced biofuels"

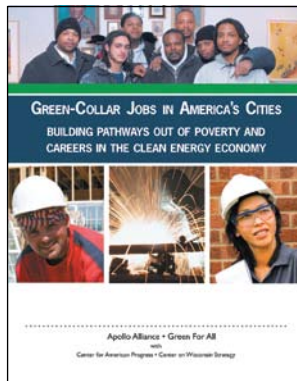
(Taken from the Center for American Progress report summary:  
[http://www.americanprogress.org/issues/2008/09/green\\_recovery.html](http://www.americanprogress.org/issues/2008/09/green_recovery.html))

"This report demonstrates how a new Green Recovery program that spends \$100 billion over two years would create 2 million new jobs, with a significant proportion in the struggling construction and manufacturing sectors ...

- Create 2 million new jobs nationwide over two years
- Create nearly four times more jobs than spending the same amount of money (\$100 billion over two years) within the oil industry and 300,000 more jobs than a similar amount of spending directed toward household consumption
- Create roughly triple the number of good jobs—paying at least \$16 dollars an hour—as spending the same amount of money within the oil industry
- Reduce the unemployment rate
- Bolster employment especially in construction and manufacturing. Construction employment has fallen from 8 million to 7.2 million over the past two years due to the housing bubble collapse. The Green Recovery program can, at the least, bring back these lost 800,000 construction jobs
- Provide opportunities to rebuild career ladders through training and workforce development that if properly implemented can provide pathways out of poverty to those who need jobs most
- Help lower oil prices
- Begin the reconstruction of local communities and public infrastructure all across America, setting a course for a long-term transition to a low-carbon economy that increases our energy independence and helps fight global warming ...”

(Taken from the Center for American Progress report summary:

[http://www.americanprogress.org/issues/2008/09/green\\_recovery.html](http://www.americanprogress.org/issues/2008/09/green_recovery.html))



**Apollo Alliance and Green for All with the Center for American Progress and the Center on Wisconsin Strategy;  
*Green-Collar Jobs in America's Cities: Building Pathways Out of Poverty and Careers in the Clean Energy Economy, March 2008***

**Report Excerpts**

“Green-collar jobs are in construction, manufacturing, installation, maintenance, agriculture and many other sectors of the economy ... While some green-collar jobs (e.g. wind turbine

technician) are in new occupations, most are existing jobs that demand new green economy skills. For example, construction companies building and retrofitting America's cities need workers with traditional construction skills who also have up-to-date training in energy efficiency. And employers doing solar installation need workers with conventional electrical training, in addition to specialized solar skills.” (Page 3)

“A sustainable, high-quality green-collar jobs program depends, at its core, on linking workers to good, permanent jobs with opportunities for career advancement.” (Page 4)

**Apprenticeship Highlights**

“At the end of the day, the most important thing your green-collar jobs program can provide is access to a family supporting, career track job. Strong links to employers, union apprenticeship programs, and other career-advancing opportunities must be built into the program from the start so participants don't get all the way through the training program only to find there are no jobs available to them.” (Page 10)



**Report Highlights**

The report detailed the following essential steps for communities to build effective green-collar jobs programs:

- Identify your environmental and economic goals, and assess local and regional opportunities for achieving those goals.
- Enact policies and programs to drive investment into targeted green economic activity and increase demand for local green-collar workers.
- Prepare your green-collar workforce by building green-collar job training partnerships to identify and meet workforce training needs, and by creating green pathways out of poverty that focus on recruitment, job readiness, job training and job placement for low-income residents.
- Leverage your program's success to build political support for new and bolder policies and initiatives.

Source: [http://www.americanprogress.org/issues/2008/03/pdf/green\\_collar\\_jobs.pdf](http://www.americanprogress.org/issues/2008/03/pdf/green_collar_jobs.pdf)

## APPENDIX C: ENVIRONMENTAL SCAN QUESTIONS

### Industry Assessments

1. Has your organization identified specific green challenges/opportunities that will be important to your industry?
2. Has your organization identified existing, or new occupations for which the training and skill requirements will be impacted by the green challenges/opportunities identified above?
  - a. Please describe which existing occupations will be impacted and how.
  - b. Please describe any new green occupations identified by your organization for your industry.
  - c. Which of these new occupations does your organization believe will be a significant source of employment?
3. Outside of your apprenticeship programs, is your organization modifying its training and education or upgrading of skills, in relation to green jobs and green technologies?
  - a. Have you developed specific curriculum or products? For example, have you developed any green related training materials, specialty courses or journeyperson upgrade classes?
  - b. Have you developed any career ladders or career pathways?
  - c. Have you developed specific strategies, approaches or specialized certificates to either upgrade the skills of the current workforce or train new workers as it relates to green opportunities?
4. What specific barriers/obstacles do you anticipate regarding the ability to meet these new or changing skill requirements? (Funding for new training or equipment? Lack of trained instructors?)

### Apprenticeship Program Structure

5. What role do you think apprenticeship will play in preparing skilled workers for green-collar job opportunities?
6. Have you identified green pre-apprenticeship programs/opportunities that could be used to prepare workers for traditional apprenticeable occupations? If yes, please describe the program and how it fits with your overall training structure.
7. Have you made any (or are you anticipating any) changes to your existing apprenticeship programs to accommodate the new emphasis on green jobs? Examples include modifying standards, utilizing technology in training, incorporating interim credentials and implementing hybrid programs.
  - a. Will this shift generate additional apprenticeship occupations?

8. Please describe any specific examples that highlight how your apprenticeship programs are aligning with green jobs and/or green technologies (i.e. successful examples of where your locals are working with the public workforce system, foundations, private organization, etc.).
  - a. Would you be willing to share these examples?

### Industry Collaboration and Partnerships

9. Has your organization developed partnerships or set up a formal structure (committee, group, etc) around green jobs and green technologies? If so, can you describe the group, its goals and purpose, and how long it has been in existence?
10. Can you specifically describe green-related partnerships with:
  - a. Workforce system
  - b. Education System
  - c. Community Based Organizations (Women, Youth, Other)

### Re-Employment

11. Please describe any activities that your organization has undertaken (alone or with other labor/management or employer associations) in an effort to retrain dislocated workers from other industries and hire them for openings with your organization. Can you please talk specifically about any efforts that involve transitioning workers from other industries (auto, manufacturing, etc)?
12. Are you (or local affiliates) currently working with your workforce system (workforce investment board (WIB) or One-Stop Career Centers) to recruit the unemployed? Do you partner with the workforce system to support other activities to retrain unemployed workers?

### Needs and Opportunities

13. What barriers and obstacles do you currently face or anticipate in the course of carrying out the activities discussed above? What specifically could the Office of Apprenticeship do to help you?

**Table 5. GREEN JOB TRAINING AND EDUCATION PROGRAMS**

PROGRAM NAME, LOCATION AND WEB SITE	PROGRAM DESCRIPTION
<b>FEDERAL PROGRAMS (NOT EXHAUSTIVE)</b>	
Energy Efficiency and Renewable Energy Worker Training Program Department of Labor <a href="http://www.dol.gov/recovery/implement.htm">http://www.dol.gov/recovery/implement.htm</a>	A program to be administered by the Department of Labor in which \$500 million will be used for research, labor exchange, and job training projects that prepare workers for careers in energy efficiency and renewable energy industries
Brownfields Job Training Program Environmental Protection Agency <a href="http://epa.gov/swerosps/bf/job.htm">http://epa.gov/swerosps/bf/job.htm</a>	A program that produces the skilled environmental technicians needed to clean up brownfields, create jobs, and spur local economic development; to date, more than 4,000 trainees have graduated from the programs funded by EPA's Brownfields Job Training grants
Solar Energy Technologies Program Department of Energy <a href="http://www1.eere.energy.gov/solar/education_training.html">http://www1.eere.energy.gov/solar/education_training.html</a>	A program that supports efforts to increase the number of qualified workers for a growing solar industry
YouthBuild Department of Labor (Federal Partner) <a href="http://www.youthbuild.org">www.youthbuild.org</a>	A program that offers free job training with a construction pre-apprenticeship and general education program to participants 16 to 24 years old who are working toward a GED or high school diploma; participants spend six to 24 months in the program, dividing their time between a YouthBuild construction site and an alternative school
Job Corps Department of Labor <a href="http://www.jobcorps.gov/home.aspx">http://www.jobcorps.gov/home.aspx</a>	A program that offers people ages 16 to 24 free education, job training, and paid apprenticeships leading to various careers including those in the energy and construction industries
<b>STATE AND LOCAL PROGRAMS (NOT EXHAUSTIVE)</b>	
Solar Richmond <a href="http://www.solarrichmond.org/">http://www.solarrichmond.org/</a>	A partnership between the Solar Living Institute, GRID Alternatives, and the city's Richmond BUILD program, the program offers free job training, paid internships and job placement assistance to low-income area residents in solar installation and energy efficiency auditing
Bronx Environmental Stewardship Training (BEST) Program <a href="http://www.ssbx.org">www.ssbx.org</a>	A program that trains local low-income residents for skilled labor in green industries; participants get 10 weeks of training in green building, urban forestry, and other green industries
GreenCorps Chicago (City of Chicago) <a href="http://tinyurl.com/cd3wlk">http://tinyurl.com/cd3wlk</a>	In existence for 12 years, the program trains participants, primarily ex-offenders, in one of four separate tracks: landscaping and urban gardening, computer refurbishing and recycling, household hazardous waste handling, and home weatherization
Wisconsin Regional Training Partnership <a href="http://www.wrtp.org/">http://www.wrtp.org/</a>	A program designed to enhance the ability of private sector organizations to recruit and develop a more diverse, qualified workforce in construction, manufacturing, and related sectors of the regional economy; WRTP's programs have placed more than 4,000 low-income, unemployed, and young job seekers into family-sustaining jobs
Oakland Green Job Corps Partnership (Cypress Mandela Training Center) <a href="http://tinyurl.com/dg26s4">http://tinyurl.com/dg26s4</a> (Ella Baker Center) <a href="http://tinyurl.com/c5r7xz">http://tinyurl.com/c5r7xz</a>	A program designed to provide "green pathways out of poverty" for young adults in Oakland facing barriers to employment; the program will provide job-readiness training, ongoing support services and on-the-job training, enabling trainees to pursue careers in green industries

## APPENDIX E: REPORT RESOURCES

### Interviewed Stakeholders

#### **Associated Builders and Contractors (ABC)**

ABC is a national association representing 25,000 merit shop construction and construction-related firms in 79 chapters across the United States. ABC's membership is comprised primarily of firms that perform work in the industrial and commercial sectors of the industry.

<http://www.abc.org/>

#### **Home Builders Institute (HBI)/National Association of Home Builders (NAHB)**

HBI is the workforce development arm of the National Association of Home Builders. HBI trains skilled workers in residential construction, promotes the industry as a career and helps the NAHB membership address its need for qualified employees. NAHB is one of the largest trade associations in the United States and serves to enhance the climate for housing and the building industry by providing and expanding opportunities for all consumers to have safe, decent and affordable housing.

<http://www.hbi.org/> and <http://www.nahb.org/>

#### **Independent Electrical Contractors (IEC)**

IEC is a national trade association for merit shop electrical and systems contractors. IEC has nearly 3,800 member companies in 67 chapters throughout the United States and serves as the voice of the electrical and systems contracting industry on issues affecting its membership.

<http://www.ieci.org/>

#### **International Union of Operating Engineers (IUOE)**

IUOE members are primarily construction workers in the United States and Canada who work as heavy equipment operators, mechanics, surveyors and stationary engineers who maintain heating and other systems in buildings and industrial complexes. IUOE currently represents roughly 400,000 workers in approximately 170 local unions and operates nearly 100 apprenticeship programs.

<http://www.iuoe.org/>

#### **Laborers' International Union of North America (LIUNA)**

LIUNA represents 500,000 workers in various fields including construction, hazardous waste remediation, state and municipal government, postal service, health care, maintenance, and food service.

<http://www.liuna.org/>

#### **National Electrical Contractors Association (NECA)/International Brotherhood of Electrical Workers (IBEW)/National Joint Apprenticeship and Training Committee (NJATC)**

NECA is the management association for electrical contractors and serves as the voice of the \$130 billion electrical construction industry that brings power, light and communication technology to buildings and communities across the U.S. IBEW represents approximately 725,000 members who work in a wide variety of fields, including utilities, construction, telecommunications, broadcasting, manufacturing, railroads and government. NJATC is one of the largest apprenticeship and training programs of its kind and is the result of a partnership between NECA and the IBEW.

<http://www.necanet.org/>, <http://www.ibew.org/> and <http://www.njatc.org/>



**National Institute for Metalworking Skills (NIMS)**

NIMS is an organization that sets skills standards for the metalworking industry, certifies individual skills against the standards and accredits training programs that meet NIMS quality requirements. NIMS has a stakeholder base of over 6,000 metalworking companies.

<https://www.nims-skills.org/web/nims/home>

**Seafarers International Union (Seafarers)**

The Seafarers International Union, Atlantic, Gulf, Lakes and Inland Waters District/NMU, AFL-CIO, represents unlicensed and licensed United States merchant mariners sailing aboard U.S.-flag vessels in the deep sea, Great Lakes and inland trades. The SIU is the largest North American union representing merchant mariners. The SEIU-affiliated Paul Hall Center for Maritime Training and Education provides apprenticeship training for jobs in the maritime industry.

<http://www.seafarers.org/>

**Service Employees International Union (SEIU)**

SEIU has over 2 million workers in more than 100 occupations in the United States, Canada and Puerto Rico and represents property services workers, public services employees and health care professionals. There are more than 300 SEIU local union affiliates and 25 state councils across North America.

<http://www.seiu.org/>

**Sheet Metal Workers International Association (SMWIA)**

SMWIA represents over 150,000 skilled men and women employed throughout the United States, Canada and Puerto Rico. SMWIA represents workers in the construction, manufacturing, service, railroad and shipyard industries. Sheet Metal Workers are unique in the construction industry as the only trade that designs, manufactures and installs its own products.

<http://www.smwia.org/>

**United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry (UA)**

The UA is a multi-craft union whose members are engaged in the fabrication, installation and servicing of piping systems. There are approximately 347,000 highly-skilled United Association members who belong to over 300 individual local unions across North America.

<http://www.ua.org/>

**United Brotherhood of Carpenters (UBC)**

UBC is North America's largest building-trades union, with more than a half-million members in the construction and wood-products industries. UBC's Carpenters International Training Fund (CITF) acts as the organization's research and development arm and provides curriculum to nearly 250 UBC-affiliated training centers in North America.

<http://www.carpenters.org/Home/>

**United Parcel Service (UPS)**

UPS is the world's largest package delivery company. The company delivers more than 15 million packages a day to 6.1 million customers in more than 200 countries and territories around the world.

<http://www.ups.com/>

**Utility Workers Union of America, AFL-CIO (UWUA)**

The UWUA represents over 50,000 members working in the electric, gas, water, professional and technical, call center, nuclear, wind and weatherization industries across the United States.

<http://www.uwua.net/>

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**Green and Sustainability  
Advocacy Organizations****Apollo Alliance**

<http://apolloalliance.org/>

**Blue Green Alliance**

<http://www.bluegreenalliance.org/>

**Green Advantage**

<http://www.greenadvantage.org/>

**Green Jobs Alliance**

<http://greenjobsalliance.org/>

**Green for All**

<http://www.greenforall.org/>

**U.S. Green Building Council**

<http://www.usgbc.org/>

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**Job Training and Grant  
Programs****Emerald Cities**

<http://www.emeraldcities.us/>

**Hard Hatted Women**

<http://www.hardhattedwomen.org/>

**Helmets to Hardhats**

<http://helmetstohardhats.org/>

**Job Corps**

<http://www.jobcorps.gov/home.aspx>

**Pre-Apprenticeship Certificate Training (PACT)**

<http://www.hbi.org/page.cfm?pageID=99>

**Veterans in Piping**

<http://www.uavip.org/>

**Women in Apprenticeship and Nontraditional Occupations  
(WANTO)**

<http://www.dol.gov/wb/programs/family2.htm>

**Job Training and Grant Programs**

**YouthBuild**  
<http://www.youthbuild.org>

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**Workforce and Economic Development Organizations**

**Advanced Center for Community, Opportunity, Resources and Development**  
[www.accordnow.org](http://www.accordnow.org)

**Center for Energy Workforce Development**  
<http://www.cewd.org/index.asp>

**Pacific Gateway Workforce Investment Network**  
<http://www.longbeach.gov/cd/workforce/>

**The Partnership for Working Families**  
<http://www.communitybenefits.org/>

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**Federal Agencies**

**Department of Education**  
<http://www.ed.gov/index.jhtml>

**Department of Energy**  
<http://www.energy.gov/>

**Department of Health and Human Services**  
<http://www.hhs.gov/>

**Department of Labor (DOL)**  
<http://www.dol.gov/>

Employment & Training Administration  
<http://www.doleta.gov/>

Occupational Safety & Health Administration  
<http://www.osha.gov/>

Office of Apprenticeship  
[http://www.doleta.gov/OA/eta\\_default.cfm](http://www.doleta.gov/OA/eta_default.cfm)

**Department of Transportation**  
<http://www.dot.gov/new/index.htm>

**Environmental Protection Agency**  
<http://www.epa.gov/>

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**Legislation**

**The American Recovery and Reinvestment Act of 2009**  
<http://www.recovery.gov/?q=content/act>

**The Green Jobs Act of 2007**  
<http://www.govtrack.us/congress/billtext.xpd?bill=h110-2847>

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## **Stakeholder Education Partners**

**Casper Community College**<http://www.caspercollege.edu>**Ferris State University**<http://www.ferris.edu/homepage.htm>**Iowa Lakes Community College**<http://www.iowalakes.edu/>**Kalamazoo Valley Community College**<http://www.kvcc.edu/>**University of Michigan**<http://www.umich.edu/>**Washtenaw Community College**<http://www.wccnet.edu/>

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## **Stakeholder Private Sector Business Partners**

**Gerding Edlen Development Company, LLC**<http://www.gerdingedlen.com/>**International Transmission Company**<http://www.itctransco.com/>

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## **Advocacy Organizations**

**Hispanic Heritage Foundation**<http://www.hispanicheritage.org/>**NAACP**<http://www.naacp.org/>**Women Work! The National Network for Women's Employment**<http://www.womenwork.worg/>

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## **Certification and Standards Organizations**

**The International Association of Plumbing and Mechanical  
Officials Standards Council**<http://www.iapmo.org/Pages/splash.aspx>**International Code Council**<http://www.iccsafe.org/>**North American Board of Certified Energy Practitioners  
(NABCEP)**<http://www.nabcep.org/>

## “green jobs”: a workforce system framework for action

FOUNDATIONAL	Policy Drivers/ Interests		Economic Recovery & Job Creation		Legislation/ Funding		Economic Competitiveness		Energy Independence, Efficiency & Security		Save the Planet		Eco-Equity						
	Transforming Industrial Sectors & Occupations	Energy Generation/Efficiency/Security								Environmental Protection									
		Renewable/ Green Energy (wind, solar, geo, biomass)		Sustainable Manufacturing		Construction/ Skilled Trades		Transportation		Government Oversight		Water Management		Materials & Waste Management					
Skill Changers		New Technologies				New Processes				New Materials									
ROLES	Align Policies & Programs/ Inclusive Investments/ Service Delivery Strategies		Education & Training Models			Strategic Partnerships for Workforce Solutions					Workforce Information				Knowledge Sharing/ Networking/ Communications		Research/ Accountability		
			Apprenticeship	Youth Pipeline	Community Colleges	Industry	Labor	Education at all Levels	Federal Partners	CBO/FBO	Labor Market Intelligence	Skills & Competencies	Career Information	Adult Education					
OPERATIONAL	ACTIONS	1. Program resources focused on re-skilling/ re-employing in green jobs		1. Map “green” education pathways leading to portable and industry recognized credentials – short term/ long term			1. Engage/convene strategic partners					1. Collaborate to develop & leverage new and existing data/information sources				1. Develop new “green” learning opportunities for workforce system staff at all levels		1. Research & evaluation	
		2. Program participants have access to “green skills” & “green jobs”		2. Identify and leverage existing education & training resources/ investments			2. Align “green” strategies with regional economic recovery and growth strategies					2. Project new jobs, chang- ing jobs, occupational definitions & new skill needs				2. Fully leverage the communication, knowledge sharing, & e-learning capacity of Workforce3 One		2. Performance reporting/ benchmarking	
		3. Build on & leverage existing sector initia- tives & green work- force solutions		3. Educate & train to industry standards/ credentials			3. Define workforce challenges					3. Refine/develop competency models, as- sessment tools, & career ladders/ lattices				3. Build & nurture a “green jobs” community of practice		3. Comprehensive system for training grantees/sub-grant- ees and monitoring compliance at all levels	
		4. Program policy & direction & strategic investments reflect focus on “green”		4. Build capacity of community colleges			4. Develop innovative workforce solutions					4. Adapt and refine career guidance tools				4. Leverage conferences & other communication forums to network & share knowledge		4. Competitive procurement for contracts & grants	
		5. One-Stop staff have knowledge about “green jobs” & service delivery strategies have “green” focus		5. Refine/develop “green” apprenticeship models			5. Asset map to share/ leverage knowledge, products, and resources					5. Collaborate to disseminate				5. Promote peer to peer & mentorship learning opportunities and pro- fessional development		5. Transparency of grant and contract making to public.	
		6. Prepare workers for emerging industry occupations			6. Collaborate! Collaborate! Collaborate!														

Source: ETA Draft Green Jobs Framework for Action: [http://www.doleta.gov/pdf/No\\_Workers\\_Frame\\_0306.pdf](http://www.doleta.gov/pdf/No_Workers_Frame_0306.pdf)

DRAFT 03-19-09



## ASSOCIATED BUILDERS AND CONTRACTORS (ABC)



### ■ HEADQUARTERS

Arlington, VA

### ■ FAST FACT(S)

ABC is a national association representing 25,000 merit shop construction and construction-related firms in 79 chapters across the United States. ABC's membership is comprised primarily of firms that perform work in the industrial and commercial sectors of the industry.

### ■ THE GREEN IMPACT

Instead of creating new green occupations, ABC sees the green movement as the catalyst for the re-classification of existing jobs designed to meet the demand for green construction products and services. Consequently, ABC will continue to work with manufacturers and vendors to update its curriculum and processes as well as to develop training on the use and installation of green products and equipment.

### ■ GROWTH AREAS

ABC did not identify specific job growth areas, but did acknowledge that new technologies may open doors to opportunities at some point.

### ■ GREEN TRAINING AND INITIATIVES

Examples of green-oriented ABC training enhancements include:

- A 15-hour green practices module that covers green products, waste management, and LEED certification requirements and processes;
- A green contractor certification program with a four-piece education component;
- Technology-based learning and hybrid training models; and
- Online courses in HVAC, plumbing, electrical work, carpentry and other areas

Additionally, ABC plans to offer its green training module online and is working with groups such as the National Center for Construction Education and Research and the U.S. Green Building Council to develop training. ABC is also in the process of developing an interim credential carpentry apprenticeship program.

### ■ NEW OCCUPATIONS

ABC has not identified any new green occupations within its industry.

## STAKEHOLDER VIEWPOINT

Apprenticeship and training, in particular crafts, will continue to be the primary avenues for preparing ABC workers for various job opportunities.

## HOME BUILDERS INSTITUTE/NATIONAL ASSOCIATION OF HOME BUILDERS (HBI/NAHB)



### ■ HEADQUARTERS

Washington, DC

### ■ FAST FACT(S)

HBI is the workforce development arm of the NAHB. HBI trains skilled workers in residential construction, promotes the industry as a career and helps the NAHB membership address its need for qualified employees. NAHB is one of the largest trade associations in the United States and serves to enhance the climate for housing and the building industry by providing and expanding opportunities for all consumers to have safe, decent and affordable housing.

### ■ THE GREEN IMPACT

HBI/NAHB sees the green movement as an opportunity to “green out” the work done by contractors, superintendents, and its general skilled, semi-skilled, and entry-level trade workforce. HBI/NAHB feels it is critical to re-skill its workforce by embedding green technology in its current occupations at all levels.

### ■ GROWTH AREAS

HBI/NAHB sees opportunity for job growth in the remodeling sector of the home building industry, especially as it relates to retrofitting and energy efficiency (often referred to as “weatherization”), in addition to new opportunities in green construction when the new housing market picks up.

### STAKEHOLDER VIEWPOINT

Crafts should not become silos as their work will impact each other as products change and installation procedures are revised to encompass green technologies.

### ■ GREEN TRAINING AND INITIATIVES

Examples of green-oriented HBI/NAHB training enhancements include:

- Green interim credentials (in development) for apprenticeship and pre-apprenticeship programs;
- Green vocational designations and certifications;
- Green training materials and text books at all levels of home construction for a variety of courses and programs including HBI/NAHB’s Pre-Apprenticeship Certificate Training (PACT) curriculum as well as materials for its Residential Construction Academy for semi-skilled and skilled workers and its Residential Construction Superintendent (RCS) designation;
- Green courses such as Green Building for Building Professionals, Green Project Management and Advanced Green Building Science;
- The integration of nationally recognized green standards and green building principles into approved apprenticeship and training programs;
- Increased utilization of interim credentials; and
- The adoption of a competency-based approach to apprenticeship training

### ■ NEW OCCUPATIONS

HBI/NAHB has identified energy raters/auditors as likely new occupations that will grow along with (though to a much lesser extent) indoor air raters/auditors, water raters/auditors, green product consultants and construction efficiency consultants. HBI/NAHB believes it remains to be seen whether solar panel installation, geothermal installation and small wind turbine installation will evolve into new occupations separate from the work currently done by builders, remodelers and/or current trades people.

## NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION (NECA) - INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS (IBEW) - NATIONAL JOINT APPRENTICESHIP TRAINING COMMITTEE (NJATC)



### ■ HEADQUARTERS

Bethesda, MD (NECA) and  
Washington, DC (IBEW and NJATC)

### ■ FAST FACT(S)

NECA is the management association for electrical contractors and serves as the voice of the \$130 billion electrical construction industry. IBEW represents approximately 725,000 members who work in a wide variety of fields including utilities, construction, and telecommunications. NJATC is one of the largest apprenticeship and training programs of its kind and is the result of a partnership between NECA and the IBEW.

### ■ THE GREEN IMPACT

NECA/IBEW/NJATC feels that there's no need for a new category of workers for green jobs and that green job opportunities should not require totally new skills, but rather a tweaking of existing skills. Consequently, the way NECA/IBEW/NJATC delivers training will be impacted by the green movement in some respects. However, NECA/IBEW/NJATC maintains that the industry it represents has always been green and that its members have been working in and preparing for what are now called "green" jobs for many years.

### ■ GROWTH AREAS

NECA/IBEW/NJATC sees opportunity for job growth in the following areas:

- Renewable energy
- Energy efficiency
- Smart Grid

### ■ GREEN TRAINING AND INITIATIVES

Examples of green-oriented NECA/IBEW/NJATC training enhancements include:

- A renewable energy curriculum and updated journeyworker upgrade and apprenticeship training and materials;
- A boot camp approach to journeyworker training focused on aspects of green technologies;
- Partnerships with vendors and manufacturers to develop training for green products and technologies;
- A blended learning model that combines classroom instruction and a Web-based learning management system; and
- A new core curriculum in which apprentices do three years of related instruction in different "green" tracks (e.g. solar, wind, distributed controls, fuel cells, etc.) after completing two years of core subjects

### ■ NEW OCCUPATIONS

NECA/IBEW/NJATC has not identified any new green occupations within its industry.

### STAKEHOLDER VIEWPOINT

The green movement should be focused on creating career pathways that lead to good, mid-level jobs instead of unsustainable, "throw-away" jobs.

## INDEPENDENT ELECTRICAL CONTRACTORS (IEC)



### ■ HEADQUARTERS

Alexandria, VA

### ■ FAST FACT(S)

IEC is a national trade association for merit shop electrical and systems contractors. IEC has nearly 3,800 member companies in 67 chapters throughout the United States and serves as the voice of the electrical and systems contracting industry on issues affecting its membership.

### ■ THE GREEN IMPACT

The green emphasis is prompting IEC to incrementally enhance apprentice training programs and develop additional continuing education modules to accommodate new technologies. Examples include a proposed hybrid approach to a low-voltage apprenticeship program with green training modules and two-year cabling technician and systems integration technician programs. IEC does not see any work being done as part of a new occupation being dramatically different from what's being done now, especially as it relates to IEC companies and contractors.

### STAKEHOLDER VIEWPOINT

IEC's companies and contractors are already aligning with the green push by offering additional training components that prepare individuals for work in green industries.

### ■ GROWTH AREAS

IEC sees opportunity for job growth in the following areas:

- Solar
- Wind
- Hydroelectric generation
- Electrical equipment upgrades in existing residential, commercial and industrial buildings
- Installation of new building automation systems and lighting controls

### ■ GREEN TRAINING AND INITIATIVES

Examples of green-oriented IEC training enhancements include:

- An expansion of apprenticeship programs to include basic training in areas such as solar, wind, photovoltaic and hydroelectric generation;
- New training modules to accommodate new technologies;
- Apprenticeship program interim credentials for specialty work in green technologies (in development); and
- Discussions with the North American Board of Certified Energy Professionals to develop training for energy certifications

### ■ NEW OCCUPATIONS

IEC does not anticipate any new green occupations within its industry.

## INTERNATIONAL UNION OF OPERATING ENGINEERS (IUOE)



### ■ HEADQUARTERS

Washington, DC

### ■ FAST FACT(S)

IUOE members are primarily construction workers in the United States and Canada who work as heavy equipment operators, mechanics, surveyors and stationary engineers who maintain heating and other systems in buildings and industrial complexes. IUOE currently represents roughly 400,000 workers in approximately 170 local unions and operates nearly 100 apprenticeship programs.

### ■ THE GREEN IMPACT

For IUOE, the green push means that jobs will change based on new products and requirements, and that incumbent workers will have to learn new systems. For example, IUOE workers perform heavy equipment operations and maintenance and will be responsible for maintaining proper particulate standards to conform to Environmental Protection Agency guidelines. Consequently, workers will need training in global positioning systems (GPS) that will allow them to work in a more streamlined fashion to complete jobs faster and keep particulate levels to a minimum.

### ■ GROWTH AREAS

IUOE sees opportunity for job growth in green building maintenance, controls (e.g. building and water temperature, etc.) and HVAC systems.

### ■ GREEN TRAINING AND INITIATIVES

Examples of green-oriented IUOE training enhancements include:

- Green awareness classes;
- Training in GPS machine guidance control systems;
- New building control and maintenance training; and
- Restructured skills training and modified apprenticeship standards

### ■ NEW OCCUPATIONS

While IUOE doesn't anticipate an abundance of new occupations, it has identified hybrid and diesel mechanics and jobs related to windmill farm work, GPS programmers and installers, and maintenance providers on heavy equipment as possible new occupations that may result from the emphasis on green job creation.

## STAKEHOLDER VIEWPOINT

IUOE faces challenges in communicating with journeyworkers about the importance of coming back for new and continuous training. However, the IUOE will meet these challenges and train a stronger, diversified workforce for the future.



## LABORERS' INTERNATIONAL UNION OF NORTH AMERICA (LIUNA)



### ■ HEADQUARTERS

Washington, DC

### ■ FAST FACT(S)

LIUNA represents 500,000 workers in various fields including construction, hazardous waste remediation, state and municipal government, postal service, health care, maintenance, and food service.

### ■ THE GREEN IMPACT

For LIUNA, “green” means new processes and procedures for existing skill sets as well as training the existing workforce to address new skill requirements. In the commercial building and infrastructure industry, green will redefine traditional work processes while also creating new work opportunities. LIUNA is also seeking to educate everyone from business owners to workers on the value of LEED certifications and green practices. In residential markets, green will be defined primarily by weatherization, not just as a stand-alone occupation, but rather a component of a larger career path tied to activities like rehabilitation, renovations, new construction and environmental remediation.

### ■ GROWTH AREAS

LIUNA sees opportunity for job growth in the following areas:

- Weatherization
- Pervious surface installation
- Solar panel installation

- Erosion control
- Commercial green roofing
- Windmill farms
- Demolition
- Waste management

### ■ GREEN TRAINING AND INITIATIVES

Examples of green-oriented LIUNA training enhancements include:

- An “Intro to Green” course tailored to meet leadership and workforce needs;
- A comprehensive residential weatherization training program;
- Updates to existing curriculum in erosion control, demolition, environmental remediation and landscaping/irrigation;
- New courses in solar, green roofing and water collection systems; and
- Continuous upgrading of all training modules as new green technologies are introduced

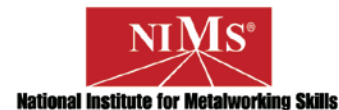
### ■ NEW OCCUPATIONS

For residential markets, LIUNA has identified weatherization technician installers, supervisors and energy auditors as new occupations. LIUNA also believes that supervisory positions in commercial construction that focus on ensuring the use of green principles and recordkeeping may evolve into their own occupations.

### STAKEHOLDER VIEWPOINT

There should be quality and sustainability with regard to [green] job creation. Green jobs should be long-term jobs that offer career pathways and living wages, not short-term skill usage that leaves individuals with no career or stability.

## NATIONAL INSTITUTE FOR METALWORKING SKILLS (NIMS)



### ■ HEADQUARTERS

Fairfax, VA

### ■ FAST FACT(S)

In pursuit of its mission to develop and maintain a globally competitive American workforce, NIMS sets skills standards for the industry, certifies individual skills against the standards and accredits training programs that meet NIMS quality requirements. NIMS has a stakeholder base of over 6,000 metalworking companies.

### ■ THE GREEN IMPACT

NIMS sees the emphasis on green jobs as an opportunity to build a “green culture” within American precision manufacturing and anticipates the creation of 1.6 million new jobs. NIMS also believes that many green opportunities will be technologically oriented, and that the precision manufacturing industry is poised to lead the way in making green products. Additionally, NIMS notes that new technologies and products will change manufacturing processes resulting in continuous improvement in energy and materials utilization and conservation. As such, this will create opportunities for the workforce to gain new skills and share in the expanded green economy.

### ■ GROWTH AREAS

NIMS sees opportunities for job growth resulting from the manufacture of green

products and components including both energy production and conservation products.

### ■ GREEN TRAINING AND INITIATIVES

Examples of green-oriented NIMS training enhancements include:

- The development of the Green Principles of Precision Manufacturing and the integration of these principles into all training modules;
- Fifty separate certifications all with embedded green education components;
- The integration of green practices into NIMS training program accreditation;
- New green training competencies and certifications;
- The inclusion of green competencies and certifications in NIMS’ competency-based National Guideline Standards for Registered Apprenticeship; and
- The continued “greening” of competencies and certifications as technology and products expand

### ■ NEW OCCUPATIONS

Generally, NIMS believes that new products and technologies will drive new green occupations. These occupations will range from precision assemblers to CNC programmers and machinists dealing with new materials in solar and nuclear energy development.

## STAKEHOLDER VIEWPOINT

There will be a huge explosion of job opportunities, and Registered Apprenticeship will be a key avenue to train both existing and future members of the workforce.

## SEAFARERS INTERNATIONAL UNION (SIU)



### ■ HEADQUARTERS

Camp Springs, MD

### ■ FAST FACT(S)

SIU represents unlicensed and licensed United States merchant mariners sailing aboard U.S.-flag vessels in the deep sea, Great Lakes and inland trades. SIU is the largest North American union representing merchant mariners. The SIU-affiliated Paul Hall Center for Maritime Training and Education provides apprenticeship training for jobs in the maritime industry.

### ■ THE GREEN IMPACT

The national and international maritime industry has increasingly become the focus of new environmental rules and regulations pertaining to oceans, rivers and bays. All maritime locations must now comply with a broad array of requirements relating to air and water quality, hazardous waste disposal, and aquatic species protection. Additionally, the nature of the maritime industry requires that standards be set at the international and national levels to protect the environment and maintain ship mobility. SIU believes that the green/environmental push will impact all seafaring occupations.

### ■ GROWTH AREAS

SIU sees expanded job growth opportunities for ship and boat operators, deck hands, and ordinary seamen who are cross-trained in safety and environmental response techniques and procedures.

### ■ GREEN TRAINING AND INITIATIVES

Examples of green-oriented SIU training enhancements include:

- Online, self-paced distance learning programs covering environmental issues; and
- Certificates for the completion of Hazardous Material Control and Management and Environmental Awareness courses

### ■ NEW OCCUPATIONS

SIU has identified waterway trash collection, oil spill response, bilge and wastewater collection vessel jobs as well as safety/environmental officer positions as new occupations within its industry.

### STAKEHOLDER VIEWPOINT

The initial exposure to the importance of green challenges and opportunities must be in the apprenticeship phase of training. Incorporating green concepts and principles into the skill sets of the mariner workforce is a top priority.

## SERVICE EMPLOYEES INTERNATIONAL UNION (SEIU)



### ■ HEADQUARTERS

Washington, DC

### ■ FAST FACT(S)

The SEIU has over 2 million workers in more than 100 occupations in the United States, Canada, and Puerto Rico and represents workers in three main divisions:

- **Health Care** which includes nurses, LPNs, doctors, lab technicians, nursing home workers and home care workers;
- **Public Services** which includes local and state government workers, public school employees, bus drivers, and child care providers; and
- **Property Services** which includes janitors, security officers, maintenance and custodial workers, stadium and arena workers, window cleaners, and other workers that provide services to commercial office buildings, co-ops, and apartment buildings, as well as public facilities like theaters, stadiums and airports.

There are more than 300 SEIU local union affiliates and 25 state councils across North America.

### ■ THE GREEN IMPACT

The emphasis on green jobs is prompting SEIU to ramp up its efforts to up-skill its existing workforce in all three divisions. SEIU believes the biggest impact will be felt in its Property Services Division since a key component of national energy efficiency policy will involve “greening” public and private buildings through energy-saving measures, green cleaning, etc.

Additionally, SEIU’s Property Services locals represent building maintenance workers and cleaners who are on the front lines of operating and maintaining existing and newly constructed green buildings.

### ■ GROWTH AREAS

SEIU sees growth for its workers in areas affected by green initiatives such as carbon emissions reduction, energy efficiency, weatherization and water conservation.

### ■ GREEN TRAINING AND INITIATIVES

Examples of green-oriented SEIU training enhancements include:

- Green Buildings classes that cover energy usage, water conservation, green cleaning and maintenance, and a variety of other topics;
- Incorporation of green principles and concepts into existing training;
- A Green Building Initiative designed to train 1,000 green building superintendents; and
- Worker training focused on energy efficient/sustainable operations and maintenance in commercial buildings and schools

### ■ NEW OCCUPATIONS

While most of SEIU’s greening efforts are embedded in up-skilling its current workforce, the union does see potential for weatherization-related occupations and a building/energy auditor occupation in its Property Services Division, as well as a green environmental services worker occupation within its Health Care Division.

### STAKEHOLDER VIEWPOINT

More work should be done to educate employers on the value of having their workforce up-skilled in green technologies.

## SHEET METAL WORKERS' INTERNATIONAL ASSOCIATION (SMWIA)



### ■ HEADQUARTERS

Washington, DC

### ■ FAST FACT(S)

SMWIA represents over 150,000 skilled men and women employed throughout the United States, Canada and Puerto Rico. SMWIA represents workers in the construction, manufacturing, service, railroad and shipyard industries. Sheet metal workers are unique in the construction industry as the only trade that designs, manufactures and installs its own products.

### ■ THE GREEN IMPACT

SMWIA says that many sheet metal workers already have the core skills needed to take advantage of green job opportunities. Additionally, SMWIA believes that green will have a significant effect on a variety of occupations in the Service and Refrigeration, HVAC, Commercial Duct and Air, Control Systems, and Testing, Adjusting and Balancing (TAB) sectors of its represented industries.

### ■ GROWTH AREAS

SMWIA sees opportunity for job growth in the following areas:

- Weatherization
- Energy auditing
- Solar panel installation
- Wind turbines (base structure) work

### ■ GREEN TRAINING AND INITIATIVES

Examples of green-oriented SMWIA training enhancements include:

- Green training modules;
- Green-oriented curriculum and materials;
- A TAB certification program for technicians; and
- Self-paced training for its apprenticeship core curriculum and other programs

### ■ NEW OCCUPATIONS

SMWIA believes green will drive the expansion of duties and responsibilities within current occupations including, but not limited to, HVAC service technicians, certified energy audit technicians, and TAB technicians.

### STAKEHOLDER VIEWPOINT

As long as apprenticeship programs are nimble and self-paced, they will be fine. Younger, millennial workers don't want the old way of doing things.



## UNITED ASSOCIATION OF JOURNEYMEN AND APPRENTICES OF THE PLUMBING AND PIPE FITTING INDUSTRY OF THE UNITED STATES AND CANADA (UA)



**UNION PLUMBERS,  
FITTERS, WELDERS AND  
HVAC TECHS**

### ■ HEADQUARTERS

Annapolis, MD

### ■ FAST FACT(S)

The UA is a multi-craft union whose members are engaged in the fabrication, installation and servicing of piping systems. There are approximately 347,000 highly skilled United Association members who belong to over 300 individual local unions across North America.

### ■ THE GREEN IMPACT

The UA maintains that the crafts it represents have always been at the forefront of education and training as it relates to environmentally friendly applications and systems. The UA partners in the development of plumbing and safety codes and believes the emphasis on green will have a significant impact on plumbing and HVAC occupations.

### ■ GROWTH AREAS

The UA sees opportunity for job growth in HVAC and plumbing as it relates to:

- New low-flow fixtures
- Gray water systems
- Solar heating
- Residential sprinkler systems

### ■ GREEN TRAINING AND INITIATIVES

Examples of green-oriented UA training enhancements include:

- A green awareness certification program;
- Partnerships with colleges to develop sustainability technology degree programs;
- Curriculum and materials focused on gray water systems, low-flow fixtures, solar panels, sprinkler fitter systems and other areas;
- Sponsoring a green training trailer (the HVAC Mobile Green Classroom) that provides information about the latest green technologies in mechanical service and construction;
- New curriculum focusing on green auditing/inspection; and
- Working with vendors to upgrade curriculum to ensure journeymen and apprentices stay current with the latest technologies

### ■ NEW OCCUPATIONS

The UA acknowledges that newer technologies and processes are changing plumbing and HVAC occupations. As such, while the UA is focusing on up-skilling its current workforce, it has also identified green auditor/inspector positions as possible new green occupations.

### STAKEHOLDER VIEWPOINT

Apprenticeship will play the defining role in preparing skilled workers for green-collar jobs.

## UNITED BROTHERHOOD OF CARPENTERS (UBC)



### ■ HEADQUARTERS

Washington, DC (United Brotherhood of Carpenters) and Las Vegas, NV (Carpenters International Training Fund)

### ■ FAST FACT(S)

UBC is North America's largest building-trades union with more than a half-million members in the construction and wood products industries. UBC's Carpenters International Training Fund (CITF) provides curriculum to nearly 250 UBC-affiliated training centers in North America.

### ■ THE GREEN IMPACT

UBC works closely with building owners and contractors to determine industry training needs as it relates to green. UBC sees the green movement as more about up-skilling the existing workforce rather than the creation of new occupations.

### ■ GROWTH AREAS

UBC sees opportunity for job growth in the following areas:

- Wind power generation
- Solar panel installation
- Construction supervision
- Weatherization

### ■ GREEN TRAINING AND INITIATIVES

Examples of green-oriented UBC training enhancements include:

- Electronic publications on green building and sustainable construction that can either stand alone or be combined into a single book for apprentice or journeyworker training;
- Green concepts and principles (i.e. "tips") incorporated into all UBC/CITF curricula;
- Specific curriculum for wind-generator and solar training;
- Training tailored to green products and equipment;
- LEED certifications (in development); and
- Green-oriented modifications to UBC's 18-month Superintendent Career Training Program

### ■ NEW OCCUPATIONS

UBC has not identified any new green occupations within its industry.

### STAKEHOLDER VIEWPOINT

There is a misconception that there are going to be all of these green jobs. The push to green is really about providing green upgrade training to the current workforce. For UBC this includes carpenters, millwrights, floor layers, pile drivers, cabinet makers, residential carpenters and interior systems carpenters.

UPS®



## ■ HEADQUARTERS

Atlanta, GA

## ■ FAST FACT(S)

UPS is the world's largest package delivery company. The company delivers more than 15 million packages a day to 6.1 million customers in more than 200 countries and territories around the world.

## ■ THE GREEN IMPACT

UPS is concentrating on “greening” its existing workforce, implementing more sustainable practices, and utilizing more environmentally friendly equipment and products. UPS’ long-term strategy includes minimizing miles driven/ flown, investing in fuel-saving technologies to reduce UPS’ dependence on fossil-based fuels, consolidating shipments and other initiatives that reduce emissions and waste. Additionally, UPS employs telematics, a technology that gathers and analyzes data from delivery trucks, to improve efficiency and reduce energy consumption and emissions.

## ■ GROWTH AREAS

UPS says that all of its occupations will be impacted by the green push. For example, UPS is up-skilling its existing mechanic workforce to handle lower emission vehicles and adding preventive maintenance measures that improve fuel efficiency.

## ■ GREEN TRAINING AND INITIATIVES

Examples of green-oriented UPS training enhancements include:

- Enhanced training for automotive, airline, and plant engineer mechanics;
- Training delivered via handheld devices to teach drivers conservation techniques;
- Educating employees about company-wide environmental goals, business practices, and initiatives;
- A dedicated intranet site that shares how employees can be more environmentally friendly at home and at work;
- Incorporation of green concepts and principles into existing training programs;
- Manufacturer-developed training for green products; and
- Sales training to help provide green products and supply chain solutions to customers

## ■ NEW OCCUPATIONS

In addition to “greening” and up-skilling its existing workforce, UPS has also created a new package dispatch supervisor position that uses dispatch system technology to ensure more fuel-efficient delivery routes. Generally, however, UPS doesn’t anticipate solely green-collar jobs but rather white/green-collar and blue/green-collar job opportunities.

## STAKEHOLDER VIEWPOINT

It is about training our people in emerging green technologies in their current positions. It is important to train workers for sustainable careers that incorporate both green and existing job responsibilities so that they can be environmental stewards in every job.

## UTILITY WORKERS UNION OF AMERICA, AFL-CIO (UWUA)



### ■ HEADQUARTERS

Washington, DC

### ■ FAST FACT(S)

The UWUA represents over 50,000 members working in the electric, gas, water, professional and technical, call center, nuclear, wind, and weatherization industries across the United States.

### ■ THE GREEN IMPACT

UWUA anticipates a variety of new occupations resulting from the emphasis on green jobs and the global nature of “green” industries (e.g. wind, solar, water, conservation, etc.). UWUA believes workers will need new skills and additional training to take on responsibilities in these new occupations.

### ■ GROWTH AREAS

UWUA sees opportunities for job growth in the wind, solar, water, geothermal, biofuel, professional and technical, and nuclear sectors of its represented industries.

### ■ GREEN TRAINING AND INITIATIVES

Examples of green-oriented UWUA training enhancements include, but are not limited to:

- Wind, solar, biofuel, nuclear and water sector apprenticeship programs;
- Additional partnerships with community colleges and other educational institutions to provide classroom and hands-on training in all renewable energy sectors and the ability to earn either a two-year associate degree,

a four-year degree, college credit or a recognized certificate;

- Development and implementation of a green occupational skills curriculum;
- Clearly defined green career ladders for the utilities industry;
- Development and enhancement of safety curriculum and training and energy conservation methods; and
- Development of a training and communications curriculum for call center/customer service operators (i.e., the language of green, renewable vocabulary, how to answer customer questions regarding green equipment, etc.)

### ■ NEW OCCUPATIONS

UWUA has identified new green occupations within its industry including but not limited to:

- Wind technicians
- Wind mechanics
- Weatherization technicians
- Solar panel installers
- Renewable energy and generator design engineers
- Environmental engineers and scientists
- Construction and site managers for wind farms, power plants, etc.
- Dispatchers
- Conservationists
- Water distribution, treatment and wastewater operation/maintenance workers

## STAKEHOLDER VIEWPOINT

For existing [training] programs, many of the current industry credentials are already green in nature. However, there may be modifications to accommodate new apprenticeable occupations.